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Determinants of corporate environmental and social disclosure in Chinese listed mining, electricity supply and chemical companies annual reports

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Determinants of Corporate Environmental and Social Disclosure in Chinese Listed Mining, Electricity Supply and Chemical Companies Annual Reports

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ABSTRACT

As the environmental and social disclosing systems have been developed over decades, the climate of corporate environmental and social responsibility is becoming mature nowadays globally. What and how environment-sensitive companies (i.e. companies that are more likely to do environmental damages) disclose such information voluntarily are extensively concerned by the public, especially in China, where strong debatable issues constantly raise as a result of the rapid economic growth. Corporate environmental and social responsibility is no longer an international obligation but a domestic demand for China. This study will enhance our understanding of a very important issue in arguably the world's most vibrant economy.

The thesis has contributed the literature in a number of ways. First, this study aimed to measure the type and extent of both corporate environmental and social reporting across the Chinese environmental sensitive industries' annual reports, which include mining, electricity supply, and chemical industries. A dichotomous method was employed and the Global Reporting Initiative third edition (G3) was selected as a benchmark. In addition, the characteristics of the companies that voluntarily disclose environmental and social information in their annual reports were to be examined under legitimacy theory. Seven hypotheses that developed seven predictor variables based on legitimacy theoretical framework with one of three industries examined each time. The variables were government ownership, management role, member of industrial association, profitability, operating leverage, company age, and firm size. Finally, results in differences across industries were to be discussed and compared.

This study aimed to measure the type and extent of corporate environmental and social reporting across the Chinese mining, electricity supply, and chemical industries' annual reports, using the Global Reporting Initiative third edition (G3) as a benchmark. In addition, the characteristics of companies that voluntarily disclose environmental and social information in their annual reports were to be examined under legitimacy theory. There are seven hypotheses that developed seven predictor variables based on legitimacy theoretical framework with one of three industries examined each time. The

variables were government ownership, management role, member of industrial association, profitability, operating leverage, company age, and firm size. Finally, results in differences across industries were to be discussed and compared.

There were a total of 193 sample companies selected from the Shenzhen Stock Exchange database, and content analysis was applied to review and examine their annual reports in 2010. The G3 guidelines were used to indicate the extent of environmental and social performances by the sample companies. Companies' specific characters for the predictor variables were also obtained from the Shenzhen Stock Exchange database. In order to accomplish the first aim of the study, descriptive statistics were used to determine the type and extent of environmental and social disclosures in the sample industries' 2010 annual reports. In addition, to accomplish the second aim, which is to examine the determinants of corporate environmental and social disclosure under legitimacy theory, univariate statistics and multiple regressions analysis were adopted. The comparisons across the sample industries were conducted after the regression analysis.

Research findings from environmental disclosure analysis showed that although mining industry disclosed slightly more information than electricity supply industry, the extent of environmental reporting for all three industries were typically low because information disclosed was limited to several categories. It was found that Chinese mining, electricity supply, and chemical industries are more likely to disclose information regarding energy and materials, which were the most concerned aspects in the Chinese society. Environmental disclosure regression analysis indicated that most of the predictor variables from legitimacy theory are able to explain the extent of environmental reporting in the sample industries. The results indicated that member of industrial association, company age, company size and profitability were significant to the extent environmental reporting across the three sample industries. However, government ownership was found to be insignificant in the study.

Results from social disclosure analysis indicated that electricity supply industries disclosed slightly more information than mining and chemical companies in their 2010

annual reports. Interestingly, all of the sample companies disclosed at least one item from the G3 social guidelines; however, the information disclosed was narrow in only a few categories, and the extent of social disclosure in the sample industries was typically low. The disclosure analysis found that Chinese mining, electricity supply, and chemical industries were more likely to disclose labour practices and decent work, and human rights information. The regression analysis showed that company size, profitability, leverage and management role have become the most significant factors, whereas member of industrial association was found to be insignificant in the sample industries.

This study concludes that on the basis of legitimacy theory, the amount of environmental and social information disclosed in the Chinese mining, electricity supply, and chemical industries' annual reports was almost the same, and the firm specific predictor variables have similar influences across industries both environmentally and socially.

DECLARATION

I hereby certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

(iii) contain any defamatory material.

Signature:

Date:

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CHAPTER 1

INTRODUCTION

Research background

China's economy has grown rapidly, at a rate of about 10% per annum in the past 30 years (China State Statistical Bureau, 2006), yet the severe impacts of this expansion on the social and natural environment have received insufficient attention. Up until now, Chinese firms' pursuit of profitability in sensitive industries (i.e. industries that are more likely to do environmental damage) has increasingly caused severe environmental and social problems. Mining, electricity supply and chemical industries were specified and highlighted to be highly sensitive by the China State Statistical Bureau and the China Electricity Council (China State Statistical Bureau, 2006; "China electricity information", n.d.). Because of the industrial operation processes, in these industries a substantial deleterious environmental impact has been caused in China, where water pollution was highlighted to be one of the most intractable issues (Chen, 2010). Chen (2010) stated that the seven water systems are in emergency, and protection of the Yellow River urgently needs "Green GDP" responsibility. Poor food product quality, poor production safety facilities, and major health and occupational accident incidents were also revealed by the news media, and identified by researchers as the consequences of the organisations' pursuit of profit maximisation (Chu, 2007; Guo, 2005; Niu, 2009). However, it is only in recent years in China that firms' social and environmental responsibility has attracted due attention of stakeholders, practitioners and academics.

The concept of corporate environmental and social responsibility was first introduced in 1990s by multinational companies, but no attention was given by anyone at that time. In 2001, China had entry to the World Trade Organisation, and a vast amount of Chinese companies became members of global supply chain. Due to the compatibility in the global market and the national demand, the Chinese President Hu Jin Tao proposed the concept of "Harmonic Society" in 2005, which first set environmental and social problems on top of the governmental agenda (Zhou, Quan and Jiang, 2012). However, the legal concept was never included in the Company Law in China and China will have

to wrestle with these environmental and social issues and solve them by emphasising the importance of environmental and social responsibility.

In this context, organisations, having the most active role in the market economy, cannot confine their attention to economic goals only, but must focus on a more extended qualitative approach and pay attention to their environmental and social responsibility through internal and external reporting (Guthrie & Farneti, 2008). According to the definition, environmental and social responsibility reporting assists society to evaluate how well an organisation is performing with respect organisation's economic and social responsibilities (Lewis, Mangos & Tile, 1995). However, in China, there are limited legislative accounting standards and legislative requirements for reporting corporate environmental and social information. In the absence of mandatory environmental and social reporting requirements, in 2006, the Shenzhen Stock Exchange (SZX) issued the 'Listed Corporate Social Responsibility Guidelines', which have been formulated in accordance with the company law, securities law and other laws (Shenzhen Stock Exchange Corporate Social Disclosure Guideline, n.d.). These guidelines instruct and require listed companies to actively fulfil regular assessment of their social and environmental responsibilities.

On the other hand, public awareness and concerns over environmental and social issues have been highlighted by the media, leading to an urgent need for additional corporate environmental and social disclosures. Although more firms are making corporate social and environmental disclosures, the level of disclosure is still inadequate (Guo, 2005; Liu, Yu, Fujitsuka, Liu, Bi & Tomohiro, 2010), especially in aspects of comprehensiveness and consistency, thus hindering appropriate analysis (Chu, 2007). In this context, social and environmental disclosures have generated considerably significant issues in the business community and growing awareness of these disclosures have encouraged researchers to examine the disclosure information and its determinants (Chu, 2007; Dai & Dong, 2010; Guan & Yu, 2009; Kong, 1996; Peng, 2009).

Given this background, this study will examine the extent of environmental and social disclosures in a sample of annual reports of Chinese mining, electricity supply and chemical industries for 2010. It will also investigate the key drivers of the companies' environmental and social disclosures and compare the results between each sensitive industry, therefore determining the motivations of the sample organisations towards corporate environmental and social responsibility.

Social responsibility guidelines

As indicated above, the Shenzhen stock exchange market has taken measures to encourage and standardise corporate environmental and social disclosures. As corporate environmental and social disclosure is still on a voluntary basis, the reporting system in China is significantly influenced by the stock exchange markets.

In 2006, as the central regions stock exchange market in China, the Shenzhen Security Exchange issued the Shenzhen Stock Exchange (SZX) Guidelines on Corporate Social Responsibility (CSR) based on the laws, standards, regulations, rules under the supervision of the Chinese Governments (Wang, Qin & Cui, 2010). The SZX guidelines on CSR reporting were issued for the companies listed on the stock exchange to improve their CSR disclosure, and have generally received high praise from shareholders for this quality initiative (Guo, 2005).

However, Peng (2009) and Yuan (2007) have pointed out that the SZX guidelines are broad advocacy instructions, in which the regulations are ambiguous because the specific content of information disclosure is unable to be identified. In addition, the SZX guidelines do not include the scope of social and environmental information, or the extent of the detail a disclosure should have. These limitations were considered to be the prime issue by Yuan (2007), Nie (2009) and Xue (2011), who emphasised that the SZX guidelines may not be suitable to examine the extent of corporate social disclosures because researchers cannot indicate the disclosed items based on these guidelines. Consequently, the SZX will not be considered for this study.

In order to obtain a consistent and competent guideline for corporate social and environmental disclosures, the author considered several initiatives, such as the Global Reporting Initiative (GRI), the “Fortune” 100 Responsibility Ranking Index, the Dow Jones Sustainability Index, the FTSE4GOOD index series issued by the Financial Times in London, Johannesburg Responsibility Investment Index, and the British Chamber of Industry Responsibility Index. The GRI, however, has been acknowledged as the most preferred index (Yuan, 2007).

The GRI was designed to improve the quality, accuracy and usefulness of corporate social and environmental reporting (Frost, Jones, Loftus & Laan, 2005). Yet, it has been adopted by many Chinese researchers because the GRI is a long-term international undertaking that measures from the multi-stakeholders level (Chu, 2007). It assists

Chinese policy makers in formulating and improving the existing reporting systems. In addition, the framework for SZX guidelines was formulated based on the GRI (Yuan, 2007). However, unlike the GRI, the SZX guidelines do not provide organisations with a specific and detailed framework for environmental and social disclosures on their activities, products and services (Xue, 2011). Researchers and organisations, therefore, can use the GRI to obtain and measure the extent of corporate environmental and social disclosures accurately. Various Chinese studies have adopted the GRI, and considered it is the highest standard and valuable initiative for social and environmental responsibility reporting (Chu, 2007; Yuan, 2007; Nie, 2009; Peng, 2009; Xue, 2011). Hence, the GRI has not only provided a strong guidance to the Chinese environmental and social reporting system, and maintained significant authority in Chinese research. Since the GRI has gained high praise as the most comprehensive guidelines for environmental and social reporting from both industries and academics, it will be employed by this study.

The GRI organisation issued its first version in 2000. The guidelines are now in their third generation (G3), which were made in late 2006. In this study, the G3 guidelines will be adopted. The G3.1 guidelines are now published and recommended to the reporters to use; however, as this study considers annual reports in 2010, companies would not have had G3.1 available that year. Therefore, this study will use G3 as the corporate environmental and social disclosure guidelines.

The G3 guidelines include 79 voluntary indicators on which to be reported (GRI, 2010). They are classified into three dimensions: economic, environmental and social indicators. This study will only consider the environmental and social aspects; there are 30 items included in the environmental indicators, which are classified into 9 categories: materials, energy, waste, biodiversity, emissions, effluents and waste, products and services, compliance, transport and overall. 40 items are included in the social aspect and they are grouped into 4 categories: labour practices and decent work, human rights, society and product responsibility.

Research aim and questions

Research aim:

The aim of this study is to adopt legitimacy theory to examine the extent and determinants of corporate environmental and social disclosures in annual reports of mining, electricity supply and chemical companies listed in China for 2010.

Three research questions are:

1. What are the type and extent of corporate environmental and social disclosures in 2010 annual reports in relation to the G3 guidelines?

2. What are the determinants of corporate environmental and social disclosures in 2010 annual reports in relation to the GRI index?

3. What are the differences, if any, between the disclosures and determinants between each selected industry?

Rationale for this study

This study is motivated by a number of factors. First, this study is conducted in arguably the world's most vibrant economy, in which mining, electricity supply and chemical industries are the most sensitive industries that have been recognised as causing the greatest environmental damage and numerous social issues in the past (Wang, 2007). Also, due to the nature of the industries, information on the environmental and social reporting practices of companies within these industries has greater relevance to the Chinese society, and greater potential information usefulness to their stakeholders. In China, strong and intensive environmental and social impacts have become increasing concerned by the stakeholders. According to Tilling (2004), there are four critical stakeholders for an organisation. These include the state, the public, the financial community and the media. Disclosures often influence decision making processes for companies' stakeholders. Based on the information in disclosure, the state may create or amend contacts, grants, legislation and tax for the relevant companies' actions towards environmental and social duties. The public, including customers, supplier and labors, would use the disclosure to ensure their rights have been protected by the companies. Tilling (2004) stated that this form of disclosure helps to ensure the continued inflow of capital, labor and customers necessary for viability. Financial institutions would use the disclosures as a benchmark to judge whether a company sustainable, whereas the media

substantially influence the decisions of other stakeholders' (Pattern, 2002). Second, by extending the existing research in China, this study examines whether the government-driven market in China induces companies to provide a significant extent of voluntary social and environmental disclosures and what firm-specific factors drive the extent of disclosure. In addition, the GRI will be used by this study, because the current Chinese social responsibility guidelines by the government are based on the GRI. The G3 is also considered by several respected Chinese researchers as the most authoritative for voluntary corporate environmental and social disclosures. Last, the results of this study will bring empirical evidence to legitimacy theory, and address the differences and similarities between each selected sensitive industry in determining the key drivers for disclosing environmental and social responsibility information.

Significance

Firstly, this study extends current Chinese research and provides an up-to-date analysis of environmental and social disclosures in the 2010 annual reports of listed mining, electricity supply and chemical industries; the incentive and motivation for disclosing this information will be analysed using the GRI guidelines. This will assist the policy makers to assess the impact of possible standards and decide on alternative disclosing policies. In addition, this study analyses the differences in the extent of environmental and social disclosures and motivation in mining, electricity supply and chemical industries. To other users of annual reports, this study will provide an insight into how companies disclose their environmental and social responsibility in China. Lastly, this study extends prior research on corporate environmental and social disclosures in China in two dimensions: first, it will overcome the shortcomings stated by previous studies because the sample size employed will be larger and will enhance the accuracy of the research findings to these sensitive industries; second, it will examine the extent of disclosure using a dichotomous index (unweighted index) for the purpose of this study. Hence, this study will provide insights from different perspectives to show the motivations of management to voluntarily issuing corporate environmental and social disclosures, and reflect the extent of the environmental and social disclosures of the sensitive Chinese companies under the GRI. Consequently, it will contribute to the literature in corporate environmental and social accounting in China.

Organisation of the study

This study is organised in the following manner: Chapter One introduces this study in aspects of research background, research objectives, research motivations, significance and an outline of this piece of research. Chapter Two explains the concurrent Chinese legislations and the disclosing system, as well as introducing the GRI. Chapter Three revises the existing literature, where Chinese studies are reviewed in terms of their relevance to social disclosures and environmental and social disclosures. Chapter Four discusses the theoretical framework and the development of hypotheses. Research methodology is outlined in Chapter Five. Chapter Six and Seven include analysis of sample corporate environmental and social disclosures. This covers the extent under dichotomous index, as well as descriptive analysis. Chapter Eight and Nine introduce data analysis, where there are tests and results of univariate, correlations and multiple regressions shown and discussed. The final chapter concludes the findings of the study, with summaries of each chapter, implications of this study, and limitations and suggestions for future studies.

CHAPTER 2

CORPORATE ENVIRONMENTAL AND SOCIAL DISCLOSURES GUIDELINES AND PRACTICES IN CHINA

Introduction

The purpose of this chapter is to present the development of environmental and social guidelines and practices in China, as well as the appropriate initiative for environmental and social disclosures selected for this study, which is the Global Reporting Initiative (GRI) Sustainability Reporting guideline. This chapter provides an overview of the legal system and regulations on environmental and social disclosures in China, and explains the appropriateness of the GRI for this study.

Legal frameworks on social and environmental disclosures

When considering the voluntary disclosure information under the Chinese legal framework, it is important to be aware of China's securities regimes. The regulatory foundation for Chinese security market is the Security Law 2006, formulated by the China Securities and Regulatory Commission (CSRC) (Lin, 2008). The 2006 Security Law includes three kinds of disclosure obligations that public companies need to follow: IPO disclosure, periodic disclosure and disclosure for specific transactions. Since annual reports are the most frequently used media for investors and stakeholders among the disclosure documents, listed companies are required by CSRC to make the reports publicly available through the media. In China, annual reports contain seven sections, these are: financial statements, ownership structure, biographic and compensation information of directors, supervisors and top managers, corporate governance performances, the directors reports, and the supervisors' reports and the other material matters. Since annual reports are the most reliable resource to convey corporate voluntary social and environmental information, they are frequently adopted by scrutinised Chinese research.

Corporate social and environmental disclosing systems are influenced by both national and local regulations and standards. The disclosing system started with the 1972 United Nations Conference on the Human Environmental in Stockholm, which later led

China’s first National Environmental Protection Conference (Lin, 2008). Environmental Protection Offices were then established in 1974 and it pronounced the first the PRC’s environmental regulation; however, there were no disclosing instructions included in this regulation (Zhang, 2008).

The Chinese corporate environmental and social reporting and provisions, which are subjected to the Constitution of the People’s Republic of China (PRC), consist of laws, provisions, regulations, ministerial and local regulations based on the Environmental protection Act of the PRC (Guo, 2005). However, there seems no corporate environmental and social disclosures obligation in annual report under the current regulations.

Lin (2008) found that there are implicit corporate social responsibility (CSR) disclosure obligations in the annual report under the current regulations – the regulation on the contents and Formats of the Annual Report (the Annual Reporting Regulation)” (Lin, 2008). The 2006 Company Law requires listed companies to consider environmental and social responsibilities in business operations. Also, the Code Corporate Governance for Listed Companies in China was promulgated in 2002, and it addresses that a listed company shall consider in the perspectives of the interest of banks, other creditors, employees, consumers, supplies, communities and other stakeholders. A number of sections and items from the Code require companies to disclosure relevant information regarding stakeholders, such as Article 28, 30 and section 8, which require directors to disclose in the manner of the interests of stakeholder concerning companies' sustainability issues, and for those companies that do not disclose, appropriate explanations for not disclosing are required to be given. It seems that under the current Chinese regulations, listed companies are required to undertake corporate social responsibility and consider the extent of their social and environmental performance in business operations. However, these regulations do not give specific list of guideline on what to disclose and how to put it into practice. Therefore, the current regulations are not adequate. Although these articles require a range of information that directors should disclose, there are no specific indicators and sectors from the laws regarding environmental and social information. This suggests that corporate social and environmental disclosure (CSED) benefits stakeholders to a great extent but disclosures are not essentially mandatory. It concludes that corporate environmental and social reporting still remains voluntary in the Chinese disclosure legal system.

Corporate environmental and social guidelines from Shenzhen Stock Exchange Market

In 2006, one of the two central regions stock exchange markets in China, Shenzhen security exchange (SZX) issued the Shenzhen Stock Exchange Guidelines on Corporate Social Responsibility (CSR) to acknowledge listed companies implementing social and environmental responsibility based on the laws, standards, regulations and rules (Wang et al., 2010). According to the SZX guidelines, the publication is "based on the Company Law and the Securities Law with purposes of achieving scientific development, building harmonious society, advancing toward economic and social sustainable development, and promoting corporate social responsibility" (Shenzhen Stock Exchange Corporate Social Disclosure Guideline, n.d.). Although the SZX guidelines were announced by the stock exchange market, applying them was under the supervision of the government (Yuan, 2007). The basic framework of the SZX guidelines is referred to as the GRI, which contain 8 chapters and 38 items that encourage the listed companies to commit to social accountability and promote sustainable economic and social development.

Since the SZX guidelines on CSR were issued, the listed companies in the Shenzhen Stock Exchange have started to declare their CSR disclosure, and the guidelines are recognized as a standard measurement from many shareholders (Yuan, 2007). Existing studies suggest that the SZX guidelines play an important role in improving the quality and quantity of corporate social disclosure. Chen (2010) explains that no companies were disclosing separate environmental and social reports or including CSR in an ordinary annual report before the SZX guidelines became published. Yet in 2007, 20 listed companies issued their stand-alone reports and have referenced SZX as their preferred guidelines. The guidelines issued from Shenzhen Stock Exchange Markets are voluntary initiatives and companies are not obliged to follow them. However, the standards have played an important role in guiding and monitoring the listed companies. Yin and Yu (2009) investigated the present status of the level of corporate social and environmental responsibility in all Chinese listed firms. They concluded that in the 2008 financial year, 32.5% of the listed companies applied the SZX guidelines for their social and environmental reporting (Yin & Yu, 2009). The significance of the SZX guidelines can be observed over the past years; however, they are not a suitable guideline for research purposes.

The SZX guidelines were influenced by the Chinese government to a significant extent; however, they are not mandatory and still remain as an advocacy and suggestive reminders. Several researchers have pointed out that the SZX guidelines do not provide the details of corporate environmental and social practices (Cheng & Tan, 2008; Nie, 2009; Peng, 2009). For example, article 35 explains that "companies should establish the social responsibility mechanism as required by these instructions and work out social responsibility reports on a regular basis based on their review and evaluation of the status quo"; and article 33 indicates that "companies shall accept the supervision and inspection of the competent authorities and pay due regard to the public comments and media reports on themselves" (Shenzhen Stock Exchange Corporate Social Disclosure Guideline, n.d.). These items encourage companies to disclose; however, there is no specific information in these guidelines. For the complete English version of Shenzhen Stock Exchange Social Responsibility Instructions to Listed Companies, see Appendix A.

Global Reporting Initiative

The review of the relevant Chinese regulations and guidelines suggests that environmental and social reporting still remain voluntary, and there are no fixed or consistent standards for companies to follow in order to prepare their disclosures. Various popular frameworks have been adopted by Chinese researchers, such as the Dow Jones Sustainability Index (DJSI), Kinder, the Lydenberg and Domini Indexes (KLD), the ICC Business Charter for Sustainable Development by International Chamber of Commerce (ICC), the ISO 14000 Series and the Global Reporting Initiative Sustainability Reporting Guidelines (GRI). Many researchers combine several guidelines to examine the level of CSED in China; for instance, Chu (2007) combined the DJSI, KLD and GRI, including 5 subcategories, such as responsibility to the nation, responsibility to shareholders, responsibility to employees, responsibility to the environment and other responsibility. The GRI was used by Niu (2009) and Peng (2009), in combinations with other guidelines.

The GRI is appropriate for this study because of a number of reasons. Firstly, the most common guidelines in China, the SZX guidelines, were based on the GRI. Although the SZX guidelines cannot be applied in a dichotomous index, they remain high standards for Chinese environmental and social regulations. Moreover, the GRI Sustainability Reporting Guidelines are the most commonly used framework internationally. The

KPMG Survey into Corporate Social Responsibility (KPMG, 2008) examined 250 top companies listed on the Global Fortune 500 and the 100 largest firms by revenue in 22 countries. The results showed that there were more than 75% of companies from the Global Fortune 500 and 70% of the 100 largest revenue firms that applied the GRI respectively.

In addition, the GRI is highly praised in China since it is the basis of the SZX guidelines because of its comprehensiveness. Hopkins (2003) contends that the GRI includes some aspects of the popular environmental and social guidelines, such as the ISO 14000 and the Global Sullivan Principles. Chu (2007) claims that the creation of GRI guidelines provides companies with prestigious standards in preparing their sustainability reports, and the guidelines offer stakeholders the opportunity to visualize the transparency of the implementation of corporate environmental and social responsibility. For these reasons, the GRI guidelines are used in this study to examine the extent of environmental and social reporting.

Description of the G3 environmental and social indicators

The GRI guidelines include 79 disclosing items, which are grouped into economic, environmental and social performance. There are 30 environmental items to be reported by companies, and they are categorized into nine groups: material, energy, water, biodiversity, emissions, effluents and waste, products and services, compliance, transport and overall. A summary of environmental indicators is presented in table 2.1.

Table 2.1

Global Reporting Initiative guidelines (G3) – environmental indicators

Indicators	Description
Materials	
EN1	Materials used by weight or volume.
EN2	Percentage of materials used that are recycled input materials.
Energy	
EN3	Direct energy consumption by primary energy source.
EN4	Indirect energy consumption by primary source.
EN5	Energy saved due to conservation and efficiency improvements.
EN6	Initiatives to provide energy-efficient or renewable energy based products and services, and reductions in energy requirements as a result of these initiatives.
EN7	Initiatives to reduce indirect energy consumption and reductions achieved.
Water	
EN8	Total water withdrawal by source.
EN9	Water sources significantly affected by withdrawal of water.
EN10	Percentage and total volume of water recycled and reused.
Biodiversity	
EN11	Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.

Table 2.1

Global Reporting Initiative guidelines (G3) – environmental indicators (Cont'd)

Indicators	Description
EN12	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas.
EN13	Habitats protected or restored.
EN14	Strategies, current actions, and future plans for managing impacts on biodiversity.
EN15	Number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.
Emissions, Effluents and Waste	
EN16	Total direct and indirect greenhouse gas emissions by weight.
EN17	Other relevant indirect greenhouse gas emissions by weight.
EN18	Initiatives to reduce greenhouse gas emissions and reductions achieved.
EN19	Emissions of ozone-depleting substances by weight.
EN20	NO, SO, and other significant air emissions by type and weight.
EN21	Total water discharge by quality and destination.
EN22	Total weight of waste by type and disposal method.
EN23	Total number and volume of significant spills.
EN24	Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally.
EN25	Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff.
Product and Services	
EN26	Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation.
EN27	Percentage of products sold and their packaging materials that are reclaimed by category.

Table 2.1

Global Reporting Initiative guidelines (G3) – environmental indicators (Cont'd)

Indicators	Description
Compliance	
EN28	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations.
Transport	
EN29	Significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting members of the workforce.
Overall	
EN30	Total environmental protection expenditures and investments by type.

The G3 social indicators consists of 40 disclosing items and there are four groups as subcategories, including labour practices and decent work, human rights performance, society performance and product responsibility performance. Table 2.2 presents the summary of social indicators for the G3 index.

Table 2.2

Global Reporting Initiative guidelines (G3) – social indicators

Indicators	Description
Labour Practice and Decent Work	
LA1	Total workforce by employment type, employment contract, and region.
LA2	Total number and rate of employee turnover by age group, gender, and region.
LA3	Benefits provided to full-time employees that are not provided to temporary or part-time employees, by major operations.
LA4	Percentage of employees covered by collective bargaining agreements.
LA5	Minimum notice period(s) regarding operational changes, including whether it is specified in collective agreements.
LA6	Percentage of total workforce represented in formal joint management–worker health and safety committees that help monitor and advice on occupational health and safety programs.

Table 2.2

Global Reporting Initiative guidelines (G3) – social indicators (Cont'd)

Indicators	Description
LA7	Rates of injury, occupational diseases, lost days, and absenteeism, and number of work related fatalities by region.
LA8	Education, training, counseling, prevention, and risk-control programs in place to assist workforce members, their families, or community members regarding serious diseases.
LA9	Health and safety topics covered in formal agreements with trade unions.
LA10	Average hours of training per year per employee by employee category.
LA11	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings.
LA12	Percentage of employees receiving regular performance and career development reviews.
LA13	Composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other indicators of diversity.
LA14	Ratio of basic salary of men to women by employee category.
Human Rights	
HR1	Percentage and total number of significant investment agreements that include human rights clauses or that have undergone human rights screening.
HR2	Percentage of significant suppliers and contractors that have undergone screening on human rights and actions taken.
HR3	Total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained.
HR4	Total number of incidents of discrimination and actions taken.
HR5	Operations identified in which the right to exercise freedom of association and collective bargaining may be at significant risk, and actions taken to support these rights.
HR6	Operations identified as having significant risk for incidents of child labor, and measures taken to contribute to the elimination of child labor.

Table 2.2

Global Reporting Initiative guidelines (G3) – social indicators (Cont'd)

Indicators	Description
HR7	Operations identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of forced or compulsory labor.
HR8	Percentage of security personnel trained in the organization's policies or procedures concerning aspects of human rights that are relevant to operations.
HR9	Total number of incidents of violations involving rights of indigenous people and actions taken.
Society Performance	
SO1	Nature, scope, and effectiveness of any programs and practices that assets and manage the impacts of operations on communities, including entering, operating, and exiting.
SO2	Percentage and total number of business units analyzed for risks related to corruption.
SO3	Percentage of employees trained in organization's anti-corruption policies and procedures.
SO4	Actions taken in response to incidents of corruption.
SO5	Public policy positions and participation in public policy development and lobbying.
SO6	Total value of financial and in-kind contributions to political parties, politicians, and related institutions by country.
SO7	Total number of legal actions for anticompetitive behavior, anti-trust, and monopoly practices and their outcomes.
SO8	Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with laws and regulations.
Product Responsibility	
PR1	Life cycle stages in which health and safety impacts of products and services are assessed for improvement, and percentage of significant products and services categories subject to such procedures.
PR2	Total number of incidents of non-compliance with regulations and voluntary codes concerning health and safety impacts of products and services during their life cycle, by type of outcomes.
PR3	Type of product and service information required by procedures and percentage of significant products and services subject to such information requirements.

Table 2.2

Global Reporting Initiative guidelines (G3) – social indicators (Cont'd)

Indicators	Description
PR4	Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes.
PR5	Practices related to customer satisfaction, including results of surveys measuring customer satisfaction.
PR6	Programs for adherence to laws, standards, and voluntary codes related to marketing communications, including advertising, promotion, and sponsorship.
PR7	Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship by type of outcomes.
PR8	Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data.
PR9	Monetary value of significant fines for noncompliance with laws and regulations concerning the provision and use of products and services.

Summary

This chapter has presented the regulations and legal system reviews in China on environmental and social disclosures. It outlines the application of GRI in China and how it is closely linked with SZX guidelines, which is important to the Chinese reporting system, by articulating the significance for adopting the G3 for the purpose of this study. The next chapter will focus on the literature review on environmental and social reporting in China. Literature will be reviewed and discussed into research on social disclosures and research on environmental and social disclosures.

CHAPTER 3

LITERATURE REVIEW

Introduction

Major Chinese listed corporate studies of determinants of social disclosures and determinants of environmental and social disclosures are reviewed. As a variety of theoretical frameworks and research methodologies were used by other research, this review will identify the existing limitations and construct basis for this study.

Chinese listed companies have played a significant role in the rapid economic growth in China for 20 years from 1991. However, the momentous increase in annual GDP has brought a great cost in excessive consumption in energy and environmental pollution. Also, the legitimate rights and interests of workers and consumers, as well as the use of resources and public interests, are often disregarded by many companies (Xia, Li & Long, 2009). This causes some organisations to face bankruptcy, where people lose trust in those companies that consider profit maximization as their only goal (Wang et al., 2010). Recently Chinese companies have reported voluntary social and environmental disclosure in their annual reports.

Given this background, this literature review investigates the determinants of this form of voluntary disclosure. This aspect has been selected because it is of growing importance to regulators and users of annual reports to have an understanding of what drives this disclosure. This literature review examines the major Chinese studies of annual report corporate social and environmental disclosure (CSED), focusing on the determinants of this form of disclosure. A number of empirical studies show an increasing trend of corporate social and environmental disclosure by firms in China, where the number of companies issuing CSED increased from a dozen in 2005 to 528 in 2009. This is not only because many companies have started to pay serious attention to their social and environmental impact, but also by pressure exerted from the public and the government. However, Chinese firms' CSED is still at the infancy level (Guan & Yu, 2009), but much research has been undertaken since 2009.

Review of empirical studies in China

There are a number of empirical studies on environmental and social disclosure in developing countries; however, cultural factors have often not been considered when investigating and comparing environmental and social disclosing mechanism internationally. Gray (2005) stated that the significance of culture differences across nations is far from clear and has been neglected. He suggested that countries that are comparable with environmental and social accounting factors have to match between societal values and accounting values, as well as the proposed classification of country groupings (Gray, 2005). On one hand, he defined professionalism, uniformity, conservatism and secrecy at the accounting subculture level as the societal and accounting dimension. On the other hand, systems authority and enforcement characteristics were included in the classification dimension. "However, for this to be feasible, further work to operationalise the link between accounting practices and accounting values will be necessary and the relevant cross-cultural data assembled and organised (Gray, 2005, p14)." Consequently, literature review in this study will not include and compare studies from other developing countries.

In addition, there is a lack of empirical studies in English on corporate environmental and social responsibility in China. The emerging body of knowledge in China has become a barrier to researchers who are not so familiar with the written Chinese language. Therefore, the significance and contribution of the empirical studies in mainland China to the environmental and social reporting system, discipline and policies are often forgotten by researchers who investigate corporate environmental and social responsibility in developing countries.

The review of empirical studies in China is categorised into studies on social disclosures and studies on social and environmental disclosures. This is because Chinese literature often considers the social dimension as the major focus when investigating corporate environmental and social disclosure; more often, they consider environmental responsibility as a part of social. This is also why literature review in this study does not include studies that are solely on environmental disclosures. In most cases, Chinese researchers combine environmental and social information. They investigate both aspects and consider them as a whole. Moreover, several studies were published and have shown exploratory perspectives about what environmental reporting is like in China, such as what the relevant regulations are and how they influence; however,

determinants were not found in these studies (see Cheng, 2008; Luo, 2006; Li, 2010; Xia, 2010).

Determinants of social disclosures

There has been increasingly large number of studies on social disclosures internationally but this section reviews studies conducted by Chinese researchers in China, focusing on corporate social disclosures (CSD). A summary of literature regarding determinants of social disclosures is shown in table 3.1.

Yang (2009) conducted a study of 208 small to medium firms by questionnaire. The questions reflected the firm's intensity of social responsibility towards employees and the public, in which the questions were grouped into firm specific factors and external factors, such as competitiveness of the market and the legal environment. The hypothesised variables were directly influenced by the questionnaire results. However, the external factors were not significant predictors of corporate social responsibility reporting. Yang (2009) found that the competitiveness of the market and the legal environmental condition were not perceived to influence corporate social responsibility disclosure at all. In contrast, the degree of social disclosures was strongly related to internal factors such as export intensity, innovation capability, management level, liquidity and financing capability.

Luo and Wu (2010) and Liang, Zhang and Wu (2011) used a similar approach to Yang (2009), where performance related factors were considered. Each variable was selected based on a number of prior research studies. Luo and Wu (2010) tested 336 sample companies listed on the Shenzhen and Shanghai Stock Exchange by analysing their 2006 annual reports. Factor analysis was used to construct a measure of CSD based on firms' ability to perform, growth, size and leverage factors. The authors considered that the influential factors behind CSD cannot be observed directly, but indirect associations can be found by analysing indirect indicators. In this case, a factor analysis was applied to reflect a high level of objectivity in the overall analysis. The authors found that CSD is predominantly related with corporate profitability and growth ability. Return on equity (ROE), return on asset (ROA) and earnings per share (EPS) were the key variables explaining CSD, as well as asset and sales growth. Firms are more likely to disclose, with higher intensity, in profitable companies. While firm size, growth capacity, core competencies and solvency also show a positive association with CSD; no significance was obtained.

In contrast, Liang et al. (2011) found that financial performance, company growth, asset quality and risk control were not influential to corporate social responsibility disclosure. They evaluated the quality of social responsibility from corporate standalone sustainability reports between 2005 and 2008 in 25 companies in banking industries. Contrary to Luo and Wu (2010), they adopted an unweighted index. The Global Reporting Initiative (G3) was used to identify disclosure items and indicators of the intensity of CSD. Subsequently, the voluntary social disclosures were considered under4 categories: social, customers, employees and stakeholders. The authors found that listed companies with large firm size had stronger levels of social responsibility. Disclosure quality also improves with the number of times a firm disclosed. They also found that stakeholders only pay little attention to CSD; the only relevant indicators were whether a company is listed. In other words, listed banks are often strictly required by the exchange markets to disclose social information.

Summary

In summary, the result from CSD that has been investigated shows that the determinants of CSD were inconsistent and do not actually relate to firms' performance. Luo and Wu (2010) found a significant relation between CSD and firms' features. Yang (2009) and Liang et al. (2011) concentrated on corporate governance and ownership structure, but no relation was found. Notably, listing status proved to be significant by Liang et al. (2011), whose study applied a different approach by using the G3 guideline. A table of hypothesized variables for social disclosures is presented in table 3.4. The major shortcomings of these studies appear to be attributable to the lack of focus on the association of CSD with firm specific factors together with inconsistent findings.

Table 3.1

Summaries of main studies on determinants of social disclosures reviewed

Author(s) (Year)	Aim	Research Method	Principle findings
Yang, C. F. (2009)	To verify the influential factors of corporate social disclosures and determine the relationship between the disclosure and firms' performance.	Sample: 208 small to medium sized manufacturing firms. Data source: questionnaires were sent to those companies that attended the China international SME Expo. Theory: stakeholder theory. Method: survey. Unit of analysis: unweighted index. Statistics: multiple regressions.	The research explained that no significance was found among external factors to firms in China, such as the competitiveness of the market and the legal environmental condition. In contrast, social responsibility disclosures infinitely fall back on internal factors. It was found the following hypotheses were significant, which were export intensity, innovation capability, management level, liquidity and financing capability.

Table 3.1

Summaries of main studies on determinants of social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Wu, Y. X.,& Luo, D. H. (2010)	To demonstrate the determinants of corporate social disclosures.	Sample: 336 companies listed in Shenzhen and Shanghai Stock Exchange, excluding financial and insurance companies. Data source: 2006 annual reports from the China Stock Information database. Theory: stakeholder theory. Method: content analysis. Unit of analysis: factor model. Statistics: factor model.	Corporate Social Responsibility Report is predominantly affected by corporate profitability and growth ability. ROE, ROA and EPS are the key drivers in measuring firms' performance, as well as asset and sales growth. It was defined by the author that the better the companies' profitability, growth capacity, scales capacity, cores competencies and solvency, the more social information was disclosed.

Table 3.1

Summaries of main studies on determinants of social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Liang, H.L., Zhang, C., & Wu, D. Y. (2011)	To construct and develop a social reporting system based on the current disclosing status in banking industry in China.	Sample: 25 banking companies listed in Shenzhen and Shanghai Stock Exchange. Data source: 2005, 2006, 2007, and 2008 annual reports from the China Stock Information database. Theory: stakeholder theory. Method: content analysis. Unit of analysis: dichotomous index. Statistics: multiple regressions.	Sample listed companies with large firm size had stronger levels of social responsibility. Disclosure quality also improves with the number of times a firm issued stand-alone CSD. Stakeholders only pay little attention to CSD; the only relevant indicators were whether a company is listed. In other words, listed banks are often strictly required by the exchange markets to disclose social information.

Although some of the studies considered environmental information as a subset of social disclosures, they did not draw conclusions about environmental reporting; instead, they considered environmental information as a part of social disclosures content. Moreover, significant relations were found in recent studies. Various methods have been used to measure the degree of the disclosure, but most of the studies did not consider annual report as a source of information.

Determinants of social and environmental disclosures

The prior research on CSED in China is overviewed in this section, which is categorized into 3 parts, depending on the research directions of the studies. This section focuses on the determinants of CSED. Table 3.2 presents a summary of the studies reviewed in relation of social and environmental disclosure to firm value, and table 3.3 presents a summary of the studies reviewed in relation of social and environmental disclosure to financial performance. A table that shows the hypothesized variables for environmental and social disclosures is presented in table 3.5.

Relation of social and environmental disclosures to firm value

Li (2006) examined the relationship between the level of a firms' social and environmental performance and the value of the sample 521 firms in year 2005, excluding financial companies listed in Shenzhen and Shanghai Stock Exchange market. The annual reports of each of the companies were collected to ascertain the level of CSED information. Li measured the categories of CSED by referring to the Chinese Corporate Governance Guidelines, such as responsibility to the environment, employees, local community, consumers and stakeholders. Tobin's Q value was used to measure the value of a firm. Li (2006) demonstrated that firm size (total assets), industry type and leverage were significant to the level of disclosure, however, a negative correlation was found between the firm value and the level of CSED. With companies issuing ST[1] shares, profitability was found to be significantly negative to CSED activities.

Yuan (2007) also examined the correlation between CSED and firm value, however, CSED was found to be positively related with firms with a higher value are more likely to provide better CSED quality. Yuan (2007) analysed the influential factors of

[1] Note: ST is the abbreviation of the English Special Treatment. The financial situation and other conditions usually appear to be abnormal for ST companies. Investments for this type of companies involve high risks and high returns.

disclosing firms' social and environmental responsibilities based on annual reports. The author used a set of relevant indicators and terms from the GRI, the Kinder, Lydenberg and Domini (KLD) 400 Social Index and the Dow Jones Sustainability Index. In this study, hypothesized variables were selected in aspects of firm specific factors, performance and governance. A multi-theoretical frameworks which were combined with stakeholder theory, information asymmetry theory, substitution theory and signal transfer theory, were adopted. The research compared 2005 annual reports, interim reports and quarterly reports for 291 listed companies in Shenzhen and Shanghai Stock Exchange, adopting the SZX Guideline. It was found that large firms better performed in ROE were significant to the level of CSED. For those companies which disclosed social and environmental information with higher intensity, a significant association to the heavy pollution industries (manufacturing, mining and oil and gas companies) were also concluded.

Liu, Mao, Li and Yan (2009) used the same methodology as Yuan (2007) where Tobin's Q value was used to evaluate the value of a firm, and they tested the CSED in relation to firms' value. The authors also adopted stakeholder theory and ascertained performance and firm specific factors. The items were selected from the Shanghai Exchange Corporate Social and Environmental Disclosure Guidelines. Liu et al. (2009) found that large firms would be much more likely to disclose social information, and the intensity of disclosed social information had no influence to firm's value. The study comprised of a sample of 115 companies annual reports for 2007 excluding firms from the financial and insurance industries listed in Shanghai Exchange.

Chu (2007) investigated the relationship between the implementation of firms' social responsibility and market performance in terms of 'contribution' expenses. Annual reports for 2003, 2004, and 2005 were extracted from a sample of 123 industrial companies listed on Shanghai Stock Exchange. The population for this study was 156. Market performance was measured in 2004, 2005 and 2006 from China Stock Information database. Stakeholder theory and efficient capital market theory were adopted for selecting the variables. The author adopted the 'contribution rate' analysis in this study, where firms' expense on tax, dividends, employee wages, environmental protection, legal right and total contribution to the society were taken into account to measure the intensity of social responsibility. However, the author demonstrates that only the amount of total contribution to society has a significant positive relationship to firms' market performance. No association was found either from dividend expense or

legal right. Therefore, the amount a firm spent on a series of social activities could not be fully explained to be significantly associated with CSED, which is not relevant to the firm value either.

Summary

The authors considered the long-term effects on CSED in terms of evaluating the firms' value and the market performance. Li (2006), Chu (2007), Yuan (2007) and Liu et al. (2009) used similar approaches by applying stakeholder theory. However, the overview of this section indicates the results to be inconsistent with correlation between the firm value and CSED. Apart from Yuan (2007) that concluded firm value is positively associated with CSED, other studies defined negative or no relationship exists between firm value and CSED. The studies also revealed that firm features, particularly the industry type and firm size indicated by total assets, were consistent with the intensity of CSED. Return on equity was found among the performance factors to be positive correlated to disclosure intensity.

Table 3.2

Summaries of main studies on determinants of environmental and social disclosures reviewed

(Studies analysing the relations between social and environmental disclosures and firm value)

Author(s) (Year)	Aim	Research Method	Principle findings
Li, Z. (2006)	The study examined the relationship between the level of a firms' social and environmental performance and the value of this firm. The study considers the short term and long term effects.	Sample: 521 companies from all industries excluding financial companies. Data source: data (annual reports) was extracted over 2003 to 2005 from WIND Stock Co., Ltd database and China securities regulatory commission database. Theory: stakeholder theory. Method: content analysis. Unit of analysis: unweighted index (presence of disclosed items); Tobin's Q value (total asset market value divided by the replacement cost of the firm). Statistics: Multiple regressions model.	Firm size (total asset), industry type and leverage were found to be significant. The author demonstrates a negative correlation between the firm value and the level of CSER a firm bears. For ST type companies, profitability was found to be significantly negative to CSR activities. The results overall proved the author's hypotheses based on stakeholder theory were correct.

Table 3.2
Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Yuan, Y.(2007)	To analyze the influential factors of disclosing firms' social and environmental responsibility based on the sample annual reports, and whether the information disclose increase firms' value in capital market.	Sample: 291 listed companies in Shenzhen and Shanghai Exchange Market. Data source: 2005 annual reports, interim reports and quarterly reports. Theory: Stakeholder theory, information asymmetry theory, substitution theory and signal transfer theory. Method: content analysis Unit of analysis: unweighted index, Tobin's Q value. Statistics: descriptive statistics, multiple regressions, case studies.	A significant relation was found between firm size and the level of social disclosures; A significant relation was found between ROE and the level of social disclosures; A significant relation was found between industry type and the level of social disclosures.

Table 3.2
Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Liu, D.R., Mao, L. M, Li, S. H., &Yan, M. (2009)	The study examined the influence of corporate environmental and social disclosures on firms' value.	Sample: 115 companies listed in Shanghai Exchange. Samples excluded firms from the financial and insurance industries. Data source: 2007 annual reports were extracted from Shanghai Exchange database. Theory: stakeholder theory. Method: content analysis. Unit of analysis: Tobin's Q value (yearend market value of equity+ year end book value of liabilities)/book value of total assets. Statistics: regression model.	The study concluded that large firms would be much more likely to disclose social information, and the intensity of disclosed social information has no influence to firm's value.

Table 3.2
Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Chu, X. (2007)	To analyze the intensity of firms' social responsibility based on annual reports, and seek for relationship between the implementation on firms' social responsibility and market performance.	Samples: 123 Shanghai stock market's industrial companies Data source: 2003, 2004, 2005 annual reports. Market performance was measured in 2004, 2005 and 2006 from China Stock Information database. Statistics: descriptive statistics, simple non-linear regression and multi-linear regressions. Unit of analysis: unweighted index. Theory: stakeholder theory, efficient capital market theory.	The level of total social responsibility has a significant positive relationship to firms' market performance. The level of responsibilities contributed to the nation and employees has insignificant positive correlations to firms' market performance. The level of responsibilities contributed to investors and innovation has no relationship between firms market performance.

Relation of corporate social and environmental disclosures to financial performance

Peng (2009) aimed to construct an appropriate CSED framework. Peng (2009) also attempted to determine the key drivers of CSED in the content of annual reports, and how it relates to firms' performance. The author selected the top 100 companies by firm size (sales revenue) in China. Annual reports for 2008 and sustainability reports were extracted from companies' websites, media websites, and relevant information from the government websites. The variables were hypothesised based on triple bottom line and stakeholder theory. Peng (2009) scored the CSED by comparing the annual reports with the CSED Index, which was constructed based on a number of guidelines, in particular the G3 guidelines and the SZX guidelines. It was identified that the firms that were large in size and were active in social responsibility implementation had a strong likelihood to disclose more intensive social and environmental information. The author also demonstrated that the firms were more likely to disclose when there were much negative social or environmental news. It was also found that the level of corporate social responsibility information disclosure was significantly higher for the state-owned enterprises, indicating that the relevant regulatory bodies to promote social responsibility information disclosure have a significant effect. No relationship was found in companies' financial performances and the industry type.

Nie (2009) intended to analyse the level of corporate social and environmental information presented by firms' periodic reports. The study explored the relationship between the firms' corporate environmental and social responsibility and their financial performance by applying stakeholder theory. It was identified among 147 listed companies, excluding firms from the financial and insurance industries in Shanghai Exchange, that the firms with better financial performance would be more likely to implement their social responsibility; particularly return on equity (ROE) and return on assets (ROA) were found to be significant. The 'contribution rate' index was constructed, which was measured by the amount of expense to a specific social activity divided by firms' total assets. Annual reports over the period 2005 to 2007 were analysed.

Li, Jia and Meng (2009) also found ROA was significant in the research that determined the underlying reasons of social responsibility of Shanghai listed companies on voluntary disclosure by investigating information disclosed online. This result is consistent with Nie (2009). The author analysed 124 sample companies' annual reports

for 2008 extracted from companies' websites. A content analysis by word index (number of words and sentences in firms' annual reports) was adopted. Variable selection was based on stakeholder theory, and the research found that industry type, total assets and firm's performance to be significant with industry type and firm size being the key drivers.

Dai and Dong (2010) employed stakeholder theory and examined to what extent firms' financial performance influence corporate social and environmental disclosure in agricultural companies. Annual reports for 2009 from Economic Research Database in Shenyang Agricultural University were tested for 54 agricultural companies listed in Shenzhen and Shanghai Stock Exchange markets. As Nie (2009) did, the authors also developed the 'contribution rate' index, where the amount spent on each category of items disclosed in social and environmental information was considered. The results indicated that a strong correlation was found between corporate management capacity and corporate social responsibility. Other determinants, such as firm size and company growth, were also found to be significant in relation to CSED. The research overall accepts stakeholder theory and explains that a high degree of corporate social disclosures improves the coordination between firms and stakeholders in the agricultural firms.

Song and Zu (2009) examined the management perception and the interpretation of corporate social responsibility in terms of firms' ownership structure, industry classification and firms' location. The samples selected for the survey focused on metal, machinery and automobile manufacturing industries over the period of 2003 to 2004, and only 83 sample companies out of 100 responded to the questionnaires. The variables and the questionnaires were designed based on the institutional theory framework. This questionnaire includes questions regarding the attitudes and intentions of top management, who are more likely to be affected by the characteristics of their firms. Thus, it may "provide an indication of the manager's inclination to respond in a particular way to corporate social and environmental responsibility" (Song & Zu, 2009, p.107). The survey asked about managers' perceptions toward social responsible behaviours in China. However, the results demonstrate that 75% of the sample firms position themselves with CSR to avoid regulations imposed by government, which is the most significant factor that drives management disclosing corporate social information. In addition, to attract institutions and investors were the second important factor for 70% of the sample firms to disclose CSR. More importantly, managers were

found to accept CSD only if no harm to profitability. The author acknowledged firm size (annual sales) and location (rich or poor regions) were significant to managers' interpretation.

Summary

A considerable body of research explained the relation between CSED and companies' market performances in terms of stakeholder theory, while offering studies which adopted various approaches in order to measure the level of social and environmental information companies disclosed. Further, influences on the performance factors were determined not to be consistent and stable, however, firm specific factors were found to be associated with the extent of CSED, in particular, total assets and industry type being the most common.

Table 3.3

Summaries of main studies on determinants of environmental and social disclosures reviewed

(Studies analysing the relations between social and environmental disclosures and financial performance)

Author(s) (Year)	Aim	Research Method	Principle findings
Peng, H. G, (2009)	The research aimed to construct an appropriate corporate social and environmental disclosure framework. It also attempted to determine the key influential factors of corporate social and environmental disclosure in the content of annual reports, and how it relates to firms' performance.	Sample: top 100 companies in their firm size (sales revenue) in China among all industries. Data source: 2008 annual reports and sustainability reports were extracted from companies' websites, media websites, and relevant information from the government websites. Theory: triple bottom lines and stakeholder theory. Method: content analysis. Unit of analysis: dichotomous. Statistics: Multiple regression models.	Large firm are active in social responsibility and are more likely to disclose more intensive social and environmental information. Also, firms were more likely to disclose when there were much negative social or environmental news. The level of corporate social responsibility information disclosure was significantly higher for the state-owned enterprises, indicating that the relevant regulatory bodies to promote social responsibility information disclosure have a significant effect.

Table 3.3
Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Nie, J. (2009)	The research intended to analyze the level of corporate social and environmental information presented by firms' periodic reports. It also explored the relationship between the firms' corporate social responsibility and their financial performance.	Sample: 147 companies listed in Shanghai Exchange, excluded the financial and insurance industries. Data source: annual reports over the period 2005 to 2007 were extracted from the Shanghai Exchange database and CSMAR database. Theory: stakeholder theory. Method: content analysis. Unit of analysis: 'contribution rate' index, measured by the amount of expense to a specific social activity divided by firms' total asset. Statistics: ordinary least square.	The author found that firms with better financial performance would be more likely to implement their social responsibility; particularly ROE and ROA were found to be significant.

Table 3.3

Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Li, Y. P., Jia, H., & Meng, X. F. (2009)	To access the underlying reasons of social responsibility of Shanghai listed companies on voluntary disclosure by investigating information disclosed online.	Sample: 124 sample companies Data source: 2008 annual reports extracted from companies' websites. Theory: stakeholder theory Method: content analysis Unit of analysis: word index (number of words and sentences in firms' sustainability reports) Statistics: regression models	The study found the following hypotheses were significant to the level of corporate social responsibility: industry type, total asset and firm's performance, where the industries type and the firm size being the key drivers.

Table 3.3
Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Dai, F. J., & Dong, S. L. (2010)	The study examined to what extent corporate social and environmental disclosures influence firms' financial performance among agricultural companies.	Sample: 54 listed agricultural companies in Shenzhen and Shanghai Stock Exchange markets. Data source: 2009 annual reports from RESEET database. Theory: stakeholder theory. Method: content analysis. Unit of analysis: unweighted index (measured the 'contribution rate' index, where the amount spent on each category of items disclosed in social and environmental information was considered). Statistics: factor model.	A strong correlation was found between corporate management capacity and corporate social responsibility. Other determinants, such as firm size and company growth, were also found to be significant in relation to CSED. The study overall accepts the theory and explains that more social information that a firms discloses would help to improve the coordination between firms and stakeholders in the agricultural firms.

Table 3.3
Summaries of main studies on determinants of environmental and social disclosures reviewed (Cont'd)

Author(s) (Year)	Aim	Research Method	Principle findings
Song, L & Zu, L(2009)	To investigate how Chinese executives and managers perceive and interpret CSR. To analyze to what extent firms' productive characteristics influence managers' attitudes towards CSR rating. To examine the relationship between the level of CSR and firms' economic performance.	Sample: 83 manufacturing companies (metal, machinery and automobile industries) Theory: institutional theory Method: survey Statistics: multiple regressions, logit model	Firms' financial performance was found to be significant to managers' corporate social responsibility orientation. It was also found to be significant over firm size and product. The author suggested that economic performance and managers' interpretation of corporate social responsibility activities were the key determinants. Firms (75%) position themselves with CSD to satisfy the government. Seventy per cent were found to attract bankers and investors.

Conclusion

The literature review indicated that firm specific factors such as ROA, ROE and list status, were the key drivers that influence both CSD and CSED. Firms within heavy polluting industries, including mining, manufacturing, oil and gas, and water and electricity supply sectors, were shown to disclose more information. Some studies demonstrated the performance factors including ROE and ROA are significant (Luo & Wu, 2010; Yuan, 2007; Li et al., 2009; Nie, 2009, Dai & Dong, 2010), while other studies show the result to be inconsistent (Liu et al., 2009; Peng, 2009; Song & Zu, 2009). Therefore, no consistent relation could be obtained from the existing Chinese literature as to whether CSED would increase firm value or companies' market performances.

The large number of social and environmental criteria used to score CSED may at least partly explain these inconsistent results. These criteria included SZX Corporate Social Disclosure Guidelines, SSE Social and Environmental Disclosure Guidelines, Chinese Corporate Governance Guidelines, KLD400 Social Index and GRI. Peng (2009), Nie (2009) and Liang et al. (2011) aimed to develop an appropriate frame in order to guide the companies to disclose social information to an acceptable level. On the other hand, Li (2006), Yuan (2007) and Liu et al. (2009) used the Tobin's Q value to determine firm value, and Nie (2009), Chu (2010) and Dai and Dong (2010) adopted the 'contribution' perspective, where the amount spent on each indicator disclosed in CSED was considered. Furthermore, studies of environmental and social disclosures that applied an unweighted index method were not shown to be using solely the GRI index.

This review of the literature highlights the increasing concerns from the stakeholders to CSD, and the close association between corporate characteristics and voluntary social and environmental disclosures. However, these existing Chinese studies have only been mainly based on stakeholder theory or multiple theoretical frameworks, and they often disregarded the influences from the Chinese government to corporate social information and practices. Hence, there is a gap for adopting the legitimacy theory in order to determining the motivations of CSED. In addition, the extent of CSED was not measured by the dichotomous index under the G3 initiatives, neither was the GRI considered to be used solely. The GRI are important because they were the framework of the SZX guidelines made by the government. Yet, the GRI is more comprehensive and specific than the existing social reporting guidelines (SZX guidelines). Therefore,

influences to the motivations of the companies' voluntary social and environmental disclosures will be determined by using the GRI.

This study is designed to overcome the shortcomings from the previous Chinese studies. An unweighted index will be used under the G3 guidelines. As Chen (2010) stated, the Chinese corporations receive significant pressure from the government, which may be the reason that firms reporting social information to 'rescue' their legitimacy. Thus, the hypotheses development and variables are considered from the legitimacy theory approach. In addition, the sample of the study will include the sensitive industries, which are mining, electricity supply and chemical companies.

In conclusion, this review has identified gaps and inconsistencies in results and methodology in the literature. This knowledge will be used to design a study of corporate environmental and social disclosures in China based on a sound theoretical framework and research methodology.

Table 3.4

Hypothesized variables for social disclosure

Variable/Study	**Liu et al., 2009**	**Luo & Wu, 2010**	**Yang, 2009**	**Liang et al., 2011**
firm features				
List				√*
Times of disclosing social or Environmental information				√*
Age of export business or company			√	
Total asset(size)		√		√*
No. of employee([size)		√	√	
firm performance				
ROE		√*		√
ROA		√*		√
EPS		√*		
ROS		√	√	√
Operating income		√		
Net profit		√		
Sales of export/total sales			√*	√
Earnings ratio			√	
corporate governance				
Management level (number of independent directors)			√*	√
company growth				
Asset growth		√		
Sales growth		√		
ownership structure				
State shareholding ratio	√	√		
Top shareholding ratio		√		
leverage				
Total liability/total asset		√		
other variables				
Liquidity		√	√	
Expense on R&D			√*	
Financing capacity			√	
Governmental regulation	√*			

√ these variables were found to be significant*

Table 3.5

Hypothesized variables for environmental and social disclosures

Variable/Study	**Li, 2006**	**Chu, 2007**	**Yuan, 2007**	**Liu et al.,2009**	**Li et al., 2009**	**Nie, 2009**	**Peng, 2009**	**Song & Zu, 2009**	**Dai & Dong, 2010**
firm features									
Industry type	√*		√*	√	√*		√	√*	
Total asset(size)	√*		√*	√*	√*	√			√*
Total equity(size)						√			
No. of employee(size)								√	√
Location					√			√*	
Total revenue(size)							√*	√*	
firm performance									
Share price/EPS									
ROE			√*	√		√*	√		
ROA			√		√*	√*			√
EPS				√					
ROS									
Operating income									√*

√* *these variables were found to be significant*

Table 3.5

Hypothesized variables for environmental and social disclosures (Cont'd)

Variable/Study	**Li, 2006**	**Chu, 2007**	**Yuan, 2007**	**Liu et al., 2009**	**Li et al., 2009**	**Nie, 2009**	**Peng, 2009**	**Song & Zu, 2009**	**Dai & Dong, 2010**
corporate governance									
Number of independent directors			√						√
Management power and education			√					√	
company growth (assets, equity growth)									√
ownership structure									
State shareholding ratio	√				√		√*	√	
Top shareholding ratio	√		√						
leverage	√*		√						
Liquidity									√
Expense on social contribution		√*				√			
Media information on corporate social responsibility							√*		

√* these variables were found to be significant

CHAPTER 4

THEORETICAL FRAMEWORK AND HYPOTHESES

Introduction

This chapter describes legitimacy theory and the legitimacy theory framework relevant to the study. The research hypotheses tested in this study are developed based on this framework and the literature review outlined in the previous chapter. These include justification for each hypothesised variable in respect with the theoretical framework and the findings from the existing literature.

Legitimacy theory framework

Legitimacy theory will be considered to explain why some organisations might choose to voluntarily disclose environmental and social information to outside parties.

Legitimacy theory has become one of the most cited theories within the social and environmental accounting area. According to Suchman (1995), "legitimacy is a generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs and definitions" (Suchman, 1995, p. 574). From an organisational view, legitimacy is an operational resource that an organisation extracts from its society or cultural environment in order to pursue the goals.

Deegan (2002) defined that organisations continually seek to ensure that their activities are perceived by outside parties as 'legitimate'. They are social creations where "firms are recognised by performing various social actions" (Deegan, 2002, p. 292). Under this definition, the willingness of societal acceptance of organisations' continuing operation largely influences companies' social citizenship. Within legitimacy theory, 'legitimacy' is considered as a fundamental resource on which an organisation is dependent for survival (O'Donovan, 2002). There are certain actions and events can increase legitimacy whereas some decrease it. Organisations having low legitimacy will have potentially negative consequences "which eventually lead to the forfeiture of their right to operate" (Tilling, 2004, p.4). However, the amount of legitimacy is often very subjective. Hybels (1995) argued that good models in legitimacy theory must examine

the relevant stakeholders. This is to ensure that how important the stakeholders influence the flow of business resources. Critical organisational stakeholders were identified by Hybels (1995), such as the state, the public, the financial community and the media. The importance of each stakeholder is different across nations due to cultural differences. Therefore, under this approach, the organisations are assumed to be influenced by their continuing operations, as well as the society where they operate.

Legitimacy brings unprecedented benefits to organisation. Companies often try to manage legitimacy because it helps with the continued inflow of capital, labour and market reputation, and provides managers with a degree of autonomy to decide how and where business will be conducted (Neu, Warsame & Pedwell, 1998). In addition, it is difficult to directly assess organisations' legitimacy and often researchers need to focus on measuring it in terms of the resources related to what stakeholders provide. Hybels (1995) states that "rather than engaging in the further development of entirely abstract constructions of the legitimating process, researchers should investigate the flow of resources from organisational constituencies as well as the pattern and content of communications" (Hybels, 1995, p.244).

Legitimacy theory is based on the notion of a social contract (Guthrie & Parker, 1989), and it has been derived from political economy theory (Gray, Owen & Adams, 1996). Deegan (2002, p. 288) directly pointed that 'social contract' is not easy to define, "but the concept is used to represent the multitude of implicit and explicit expectations that society has and how the organisation should conduct its operations". As Mathews (1993, p.29) states,

> the social contract would exist between corporations and individual members of society. Society provides corporations with their legal standing and attribute and the authority to own and use natural resources and to hire employees. Organisations draw on community resources and output both goods and services and waste products to the general environment. The organisation has no inherent rights to these benefits, and in order to allow their existence; society would expect the benefits to exceed the costs to society.

Social, political and economic issues could not be separate when studying CSED, because each of the issues could be significant and has to be linked with another when investigating (Deegan, 2002). Legitimacy theory assumes that voluntary CSED is in response of social, economic and political factors and legitimises management and its activities. In the short run, organisations attempt to establish coexistence between their

social value and the society; however, different communities often have a different definition of legitimate corporate behaviour (Deegan, 2009). Therefore, the companies cannot do ‘right’ or ‘wrong’ but the society has the right and privilege to assess them (Christopher, 2002).

Legitimacy theory is one of the most adopted mechanisms for explaining corporate environmental and social disclosures but it is not the only theory that can be used. Other major theories that are also often being employed for investigating environmental and social disclosure, such as agency theory, institution theory, stakeholder theory, informational asymmetry theory and political cost theory; however, these theories overlap to some extant when explaining corporate environmental and social disclosure. For example, an overlap between legitimacy theory and stakeholder is that, in legitimacy theory, the ultimate goal for an organisation is to be legitimate and recognised by the society, where it has to establish its own legitimacy from critical organisational stakeholders. Consequently, the perspectives from the stakeholders play a critical part in judging whether an organisation is legitimate.

In addition, legitimacy is not static, but changes over time depending on the relationship between the organisations and the supervising or monitoring authorities, most likely the government. Scott, Ruef, Mendel & Caronna (2000) stated that the establishment of legitimacy is a contested progress that changes over time. An organisation may not be deemed as legitimate if no efforts and accounts have been made when there are new legal and professional requirements by the authorities (Scott & Ruef, 2006). Legitimacy is also influenced by changes in society values. Cultural factor accounts as a large social framework in which a social entity is nested and supported (Berger, Ridgeway, Fisek & Norman, 1998). Subsequently, legitimacy is different across nations.

An important reason legitimacy theory is suitable is that, in China, an inseparable relationship between the state and its firms generates important social roles for the state-owned firms. This enables Chinese companies, particularly the state-owned companies, to have a tradition of taking social and environmental responsibilities (Li & Wang, 1996). This legacy of the ‘iron rice bowl’ concept regarding lifetime employment and welfare persists (Song & Zu, 2010), although a lesser degree can be observed in modern China. In addition, the managers in the state sector maybe often appointed by the Communist Party, subsequently, decisions made by the state-owned firms maybe

amended by the Party leader. As a result, the management level of the appointed firms would always be the Communist Party members. Therefore, “they would naturally share their ideology with the state in favour of the communist tradition” (Song & Zu, 2010, p. 106).

Another reason legitimacy theory is suitable for this study is because the mining, electricity supply and chemical industries are the most sensitive industries, which are often exposed and concerned by the mass media and the public (Wang et al., 2010). According to O’Donovan (2002), repair legitimacy has been often related to crisis management. This suggests that companies in sensitive industries are more likely to be more “reactive, usually to an unforseen and immediate environmental crisis” (O’Donovan, 2002, p. 344). In addition, to maintaining or gaining legitimacy, managements are required to “keep current” and be “proactive” with their social responsibility as the public requires over time (O’Donovan, 2002). In other words, CSED through annual reports can be explained as one of the effective communication tactics to implement legitimisation strategies (Lindblom, 1994). Therefore, legitimacy theory predicts that companies issuing social and environmental disclosure will obtain, retain or repair legitimacy effectively.

From the legitimacy theory framework and review of the literature, seven testable hypotheses have been developed to explain voluntary reporting on CSED in China. The independent variables related to the seven hypotheses are government ownership, management role, member of industrial association, profitability, operating leverage, company age and firm size.

Research hypotheses

Government ownership (GOWN)

State-owned firms would receive close attention by the government and the public because these firms’ operations and activities are often exposed and directly linked with the society and the media due to their perceived market power position and ownership structure (Peng, 2009). To avoid unfavourable news and influences, the management is more likely to disclose voluntary environmental and social information. Existing literature (see Li, 2006; Li et al., 2009; Peng, 2009; Song & Zu, 2009) found positive association between government ownership and the extent of social and environmental disclosure that sample companies reported. However, only Peng (2009) determined this

association to be significant. Nonetheless, the following hypothesis will be tested to determine if government ownership influences the extent of voluntary environmental and social disclosure.

H1a: The extent of voluntary environmental and social disclosures in the annual reports of Chinese listed mining companies is positively related to government ownership.

H1b: The extent of voluntary environmental and social disclosures in the annual reports of Chinese listed electricity supply companies is positively related to government ownership.

H1c: The extent of voluntary environmental and social disclosures in the annual reports of Chinese listed chemical companies is positively related to government ownership.

In previous studies, when the government is concerned with having influences to disclosing activities, government ownership has been always set as a dummy variable (see Li, 2006; Li et al., 2009; Peng, 2009), where a company will be given a score of '1' if it is state-owned, otherwise the score will be '0'. Therefore, in this hypothesis government ownership will be set as a dummy variable accordingly.

Management role (MNGR)

More responsible managers are often assumed to provide better voluntary environmental and social disclosure. According to O'Donovan (2002), managerial intentions of using legitimisation strategies can vary among industries. In sensitive industries, companies are subjected to greater public exposure, thus management might elect maintain, gain or repair legitimacy through public disclosures (Hu, 2009). From legitimacy theory perspective, these three strategies are in a sequence that reflects increasing difficulty for management and higher levels of required proactive involvement particularly in annual reporting (Deegan, 2009). This response is facilitated by the level of internal control that a high management role provides. However, management may adopt accounting policies that suit their personal benefit (Yuan, 2007). In this situation, rather than electing legitimacy, they may pursue short-term benefit, neglecting the enterprises' long-term sustainable benefit such as environment protection and employee welfare (Yuan, 2007). According to other studies, management role is measured by the proportion of independent directors over the total number of directors (Yuan, 2007; Nie, 2009). This study assumes that the higher the management role, the more likely a company would issue environmental and social disclosure (See Li, 2006;

Yuan, 2007). Therefore, the following hypothesis will be tested to determine the relationship between management role and the level of voluntary environmental and social disclosures.

H2a: The extent of voluntary environmental and social disclosures in the annual reports of Chinese listed mining companies is positively related to management role.

H2b: The extent of voluntary environmental and social disclosures in the annual reports of Chinese listed electricity supply companies is positively related to management role.

H2c: The extent of voluntary environmental and social disclosures in the annual reports of Chinese listed chemical companies is positively related to management role.

In this hypothesis, management role rate will be the ratio between the number of independent directors and the total number of directors.

Member of industrial association (MIA)

Due to the nature of social and environment sensitive work, there are a number of industrial associations established by the government for supervising and monitoring purposes. These companies are therefore more likely to face media exposure and political pressure from the government because they are directly monitored by the state. Under legitimacy theory, those companies will be more likely to lose legitimacy which threatens their 'survivals' to a significant extent (Deegan, 2002). Previous studies have indicated that in China, the presence of being a member of a local industrial association would have a considerable impact to companies' behaviour implementing their social contract to the society where they operate (Li, 2006). These studies provide solid foundations and concepts to this hypothesis (see Li et al., 2009; Song & Zu, 2009; Yuan. 2007). Hence, the following hypothesis will be tested to determine if there is a link between companies' membership of an industrial association and the extent of voluntary environmental and social disclosure.

H3a: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed mining companies is positively related to membership of an industrial association.

H3b: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed electricity supply companies is positively related to membership of an industrial association.

H3c: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed chemical companies is positively related to membership of an industrial association.

This hypothesis has been set as a dummy variable, as in previous studies, where if a company is a member of an industrial association, it will be given a score of '1', otherwise '0' (Li et al., 2009; Song & Zu, 2009; Yuan, 2007).

Profitability (PROF)

The relationship between profitability and the level of environmental and social disclosure has been thoroughly discussed in existing Chinese literature (Liu et al., 2009; Yuan, 2007; Peng, 2009), where firms with higher financial performance are more likely to have a more advanced social disclosure. Legitimacy theory posits that companies are bound to an unwritten social contract within the society where they operate. Failure to comply with their legitimacy will threaten companies' performances and 'survival' (Deegan, 2002). In addition, Nie (2009) noted that positive news may facilitate investors' decision-making processes, and encourage them to build trust upon management. In return, this will reflect from management's compensation because a substantial increase in profit is shown to the shareholders, and so managers are more likely to disclose voluntary social information. Hence, it is not only in response to the 'resource' by the society where companies operate, higher profitable companies will be more likely to disclose voluntary environmental and social information. Therefore, the following hypothesis will be tested to determine the relationship between profitability and the extent of voluntary environmental and social disclosure.

H4a: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed mining companies is positively related to profitability.

H4b: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed electricity supply companies is positively related to profitability.

H4c: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed chemical companies is positively related to profitability.

Consistent with previous research, this study will use return on assets (ROA) to represent profitability.

Operating leverage (LEV)

There are a number of ways that companies may adapt in order to comply with social expectations and maintain or obtain legitimacy. Dowling and Pfeffer (1975) indicated that an organisation may consider altering the definition of social legitimacy through communication. Therefore, disclosing social and environmental information matches the organisation's practice, output and value. However, companies may have different capital structure, which creates conflicts to management to disclose or not.

Leverage ratio represents a company's ability to meet financial obligations, and can capture the importance of creditors as stakeholders in a firm's wealth (Ma & Zhao, 2009). As creditors and financial institutions may share potential liabilities, they may demand information in order to meet their debt obligations. Potentially, there can be conflicts between disclosing social information and incentives of management. This is because from the shareholders' perspective, disclosure of social and environmental information may be perceived as a confession of guilt, so that they are reluctant to issue social disclosure in order to maintain their own value (Ma & Zhao, 2009). According to Christopher and Filipovic (2008) and Ma and Zhao (2009) the higher the leverage, the more the company is likely to disclose social information. This also implies that if creditors are concerned with social responsibility activities, the company will be more likely to disclose environmental and social information. Therefore, the following hypothesis will be tested to determine the relationship between operating leverage and the extent of voluntary social disclosure.

H5a: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed mining companies is positively related to operating leverage.

H5b: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed electricity supply companies is positively related to operating leverage.

H5c: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed chemical companies is positively related to operating leverage.

Previous studies that adopted debt to equity ratio to determine companies' operating leverage. To be consistent with the literature, this study will use debt to equity for operating leverage ratio.

Company age (AGE)

Under legitimacy theory, organisations' societal existence depends on the acceptance of the society where they operate. As the organisations can be influenced by, and have influences to the society, legitimacy is assumed as an important resource determining their survival (Deegan, 2002). Older companies with longer societal existence may have taken relatively more legitimacy. According to Yang (2009), these companies usually have longer performance experience and histories, and are mature. Subsequently, organisations' reputation and involvement of social responsibility may become ingrained (Kong, 1996). As a company operates longer, there will be more communication needed to the outside community. This provides companies with wide social networks, affecting their public images (Yang, 2009). In sensitive industries, the public and the media can be quickly alerted if a mature company reduces the extent of social activities. Consequently, it will result in company regulations and political pressure from the outside to encourage disclosing social responsibility and practices (Yuan, 2007). As voluntary social disclosure is a way that management can actively overcome this pressure from the public, the longer a company has been listed on the Stock Exchange, the more likely the company would disclose social information. Other studies have found positive significant relations between company age and the extent of voluntary social disclosure (Roberts, 1992; Yang, 2009). The following hypothesis will be tested to determine the relationship between company age and the extent of voluntary environmental and social disclosure.

H6a: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed mining companies is positively related to company age.

H6b: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed electricity supply companies is positively related to company age.

H6c: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed chemical companies is positively related to company age.

To be consistent with other studies, company age refers to the number of years a company is listed on the Stock Exchange.

Firm size (SIZE)

Large firms in sensitive industries are deemed to be more subjected to public exposure, and often they would face more legitimate issues than smaller firms (Watts & Zimmerman, 1978). As a result, large firms can be easily subjected to "public expectation of social performance, government-imposed taxation and other regulations, as well as more media attention and exposure" (Hu, 2009, p. 53). Hence, larger firms are more likely to use certain accounting policies in order to enhance their legitimacy. In addition, under legitimacy theory, large companies would be expected to comply with their 'social contact'. One effective way that they can present this, is by reporting environmental and social information through annual reports. Following legitimacy theory, larger firms would have more incentive to disclose voluntary environmental and social information to manage their social contract and legitimacy.

H7a: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed mining companies is positively related to firm size.

H7b: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed electricity supply companies is positively related to firm size.

H7c: The extent of voluntary environmental and social disclosure in the annual reports of Chinese listed chemical companies is positively related to firm size.

In previous research, firm size has been mostly measured by total assets when legitimacy is concerned (Dai & Dong, 2010; Hu, 2009). To be consistent, this study will adopt total assets to represent firm size.

Summary

This chapter has presented the theoretical framework to be used to explain the association between environmental and social disclosures in China. Seven hypotheses are developed based on legitimacy theory. The following chapter will discuss the methodology to be employed in the present study.

CHAPTER 5

RESEARCH METHODOLOGY

Introduction

This chapter is to present the research methodology used to examine the extent of environmental and social disclosures and the hypotheses developed from the previous chapter. This chapter will articulate the sample selection, research design, data collection, coding method and data analysis approaches for this study.

Sample selection

There are advantages in using annual reports as a data source because it is readily available and accessible. Since it is a secondary data source, information disclosed in annual reports does not involve any subjectivity. Also, annual reports are the chief communications path for the transmission of communication of environmental and social information from the companies to their stakeholders. Since information in annual reports has been made and audited under the bounds of corporate law, annual reports are considered to be more formal, authoritative and accurate for researchers. The annual reports will be accessed from the Shenzhen Stock information Co., Ltd. Database. This database provides comprehensive data that corresponds with the information announced in the Chinese Stock Exchange Markets. There are both domestic and foreign companies listed on the stock exchange markets in China. The foreign companies may issue English and Chinese annual reports; however, the domestic companies issue Chinese annual reports only. In addition, the English annual reports are not available in the Shenzhen Stock information Co., Ltd. Database. They can only be obtained from companies' webpage. Hence, due to data availability, accessibility and completeness, the sample Chinese annual reports for year 2010 will be selected. The financial year in China begins January 1 and concludes December 31.

The population of the listed companies to be sampled is 50 mining companies, 75 electricity supply companies, and 266 chemical companies. Due to the relatively small population in mining and electricity industries and to satisfy the objective of this study, the total sample size of this study will comprise the total population of mining and electricity supply companies and a sample of 83 chemical companies. Because the

sample chemical companies are 30% of the population, they will be selected from every third company listed on the Chinese stock exchange markets.

The rationale for selecting these industries is that these companies are highly environmentally sensitive according to China State Statistical Bureau and China Electricity Council ("China electricity information", n.d.).

In summary, the sample companies have to be under the following three circumstances: the companies are listed; a sample company is mining, or an electricity supply, or a chemical company; the companies must have issued annual reports for the 2010 financial year and the reports are available in the Shenzhen Stock information Co., Ltd. database.

Research design and data collection

The first research question involves analysing three aspects of corporate environmental and social disclosure. To investigate the type, environmental and social disclosures will be examined and scored by the G3 environmental and social initiative. The extent refers to how well in quantity corporate social and environmental disclosure is reported and presented. In order to satisfy these research questions, annual reports are considered as the source of information because annual reports are readily available and accessible, and annual reports area common and popular means of communication to shareholders and they command credibility (Nie, 2009). Consequently, to analyse the extent and characteristics of corporate social and environmental disclosure in China, annual reports constitute the main prime source. The annual reports of the sample companies during the financial period of will be used to extract the social disclosure because it is the latest period available. However, as the annual reports from the sample companies are in Chinese, it requires the use of GRI in Chinese version in order to accurately examine the extent of corporate environmental and social disclosure. It is noted that the Chinese version of GRI is identical in all respects with the English version.

Information to be extracted from the annual reports in relation to the drivers of environmental and social disclosure will be the independent variables: government ownership, the number of independent directors in proportion, membership of industrial association, return on assets, debt to equity ratio, company age and total assets.

Research coding method

A dichotomous index (unweighted index) will be used in this study to score the sample companies against each of the GRI indicators. Alternative indices were previously used by researchers, such as the number of words or weighted index. However, this study is concerned with the extent of the corporate environmental and social disclosures as opposed to the company's importance on disclosed items. One advantage for using unweighted index is that it decreases and avoids the items being treated unequally, and minimises the risk of subjectivity created when measuring the actual quantity of environmental and social disclosure (Yuan, 2007). However, one disadvantage is this index disregards the importance of the quality of disclosure of each item (Dai & Dong, 2010).

Using the dichotomous index, scores for each environmental and social aspect will be given to corporate environmental and social disclosures. A score of one for each indicator provided, and a score of zero for indicators not reported. The GRI environmental or social indicators will be added independently to provide total scores for the extent of each environmental or social disclosure by the selected companies.

An independent person with experience of using content analysis will be asked to recheck a sample of annual reports. This is essential because it overcomes the weakness of content analysis conducted by a single researcher when coding (Krippendorff, 2004). Also, as the annual reports are in Chinese, this independent person will have to be a fluent Chinese language speaker.

The G3 environmental and social initiatives include a number of subcategories. In order to satisfy the research objective, the study will not investigate in detail under the subcategories, as it is to focus on the extent of environmental and social disclosures. Scores will be given solely to environmental and social aspects overall.

In summary, a dichotomous index will be used, and the dependent variable will be measured in environmental and social dimensions. As there are 3 industries selected, there will be 6 models in total. A model for each environmental and social dimension and each industry will be independently constructed.

Data analysis

The data will be analysed using computer Predictive Analytics Software (PASW), which is also known as Statistical Package for Social Science (SPSS). First, descriptive statistics will be adopted to explore the data collected, and frequencies and percentages of occurrence can be provided to summarise and analyse the intensity of environmental and social disclosure.

Second, univariate analysis will be considered to test the relation between each independent variable and the dependent variable. This will require correlation analysis.

Thirdly, the ordinary least square multi-regressions model will be used to identify the contribution to the significance of each added independent variable and determining the key influential characterises. Prior to using the regression model, it is required to test the assumptions in order to ascertain they are true, for example normality and multicollinearity. A regression model is considered to provide better robust results because it examines the combined influence of all variables to explain their relations to corporate environmental disclosure and social disclosure, and how each variable influences disclosure (Coakes, Steed & Ong, 2010). According to Hair, Anderson, Tatham and Black (1995), multi-regression model evaluates the predictive power of explanatory variable objectively while improving the prediction of dependent variable. Thus, it demonstrates statistical significance to how each independent variable affects the extent of corporate environmental and social disclosure. Another reason for choosing this method is that the majority of independent variables are either ratio or continuous variables, whereas the dependent variables are additive and non-continuous (Mendenhall, Reinmuth, Beaver & Duhan, 1988).

As this research attempts to compare three different industries in terms of their environmental and social performances, the differences of the extent and key determinants of social and environmental disclosure will be determined by running 6 independent models representing each sample industry. The models to be tested can be shown as follows:

Model 1

$$\text{CSDI}_{\text{Mining}} = \beta_0 + \beta_1 GOWN + \beta_2 MNGR + \beta_3 MIA + \beta_4 PROF + \beta_5 LEV + \beta_6 AGE + \beta_7 SIZE + \varepsilon i$$

Model 2

$$\text{CSDI}_{\text{Elec supply}} = \beta_0 + \beta_1 GOWN + \beta_2 MNGR + \beta_3 MIA + \beta_4 PROF + \beta_5 LEV + \beta_6 AGE + \beta_7 SIZE + \varepsilon i$$

Model 3

$$\text{CSDI}_{\text{Chemical}} = \beta_0 + \beta_1 GOWN + \beta_2 MNGR + \beta_3 MIA + \beta_4 PROF + \beta_5 LEV + \beta_6 AGE + \beta_7 SIZE + \varepsilon i$$

Model 4

$$\text{CEDI}_{\text{Mining}} = \beta_0 + \beta_1 GOWN + \beta_2 MNGR + \beta_3 MIA + \beta_4 PROF + \beta_5 LEV + \beta_6 AGE + \beta_7 SIZE + \varepsilon i$$

Model 5

$$\text{CEDI}_{\text{Elec supply}} = \beta_0 + \beta_1 GOWN + \beta_2 MNGR + \beta_3 MIA + \beta_4 PROF + \beta_5 LEV + \beta_6 AGE + \beta_7 SIZE + \varepsilon i$$

Model 6

$$\text{CEDI}_{\text{Chemical}} = \beta_0 + \beta_1 GOWN + \beta_2 MNGR + \beta_3 MIA + \beta_4 PROF + \beta_5 LEV + \beta_6 AGE + \beta_7 SIZE + \varepsilon i$$

CSDImining	is the extent of voluntary social disclosure in mining industry
CSDIele supply	is the extent of voluntary social disclosure in electricity supply industry
CSDIChemical	is the extent of voluntary social disclosure in chemical industry
CEDImining	is the extent of voluntary environmental disclosure in mining industry
CEDIele supply	is the extent of voluntary environmental disclosure in electricity supply industry
CEDIChemical	is the extent of voluntary environmental disclosure in chemical industry
GOWN	is government ownership (dummy variable)
MNGR	is the proportion of independent directors
MIA	is membership of industrial association (dummy variable)
PROF	is return on assets
LEV	is debt to equity ratio
AGE	is company age

SIZE	is natural logarithm of total assets
β_0	is a constant value
β_n	represents the coefficient of predictive values
ei	is a residual value

Summary

This chapter has elaborated the sample selection, research design, data collection, coding method, and data analyses for this study. The next chapter will present analysis of environmental disclosure, providing results to answer part of the first research question, where the type and extent of corporate environmental disclosure in 2010 annual reports are analysed.

CHAPTER 6

ENVIRONMENTAL DISCLOSURE ANALYSIS

Introduction

This chapter presents the environmental disclosure analysis using the methodology outlined in the previous chapter. Descriptive statistics were employed in this chapter to measure and demonstrate the extent and type of corporate environmental reporting using the Global Reporting Initiative (G3) in Chinese listed mining, electricity supply and chemical firms during the 2010 financial year. All statistical results in this study were run using the Statistical Package for Social Science (SPSS).

Level of environmental reporting

The descriptive statistics that show the number of GRI disclosures and percentage of companies disclosing in China are presented in the tables in this chapter. There are 208 listed companies in mining, electricity supply and chemical industries; however, 15 sample firms (3 mining companies, 2 electricity supply companies and 10 chemical companies) did not issue 2010 annual reports because they had only become listed in 2011. In this study, 193 sample annual reports were viewed in total. It is notable that in these industries, many companies have disclosed only general and positive information. A few companies reported information specifically related to corporate environmental information. Table 6.1 presents the results of descriptive statistics of mining, electricity supply and chemical industries respectively. It shows the extent of environmental disclosure in Chinese companies in the financial year of 2010.

The results from table 6.1 show that the extent of environmental disclosure decreases from industry to industry. The mean value represents an average number of disclosure companies reported. Mining companies have achieved an average of 2.68 disclosures per company, but electricity supply and chemical companies experienced a substantial decrease of 9.7% and 32% (2.42 and 1.82 disclosures per company). This result shows that the extent of environmental disclosure in the sample company is not high at all. This is because there are 30 disclosing items listed in the G3 and less than 10% are being reported by these companies. Interestingly, there are equal amount of disclosing

and non-disclosing companies in electricity supply and chemical industries. This shows that the extent of environmental disclosure is the same for these two industries.

Table 6.1

Descriptive statistics for mining, electricity supply and chemical companies' environmental disclosures

	Mining industry	**Electricity supply industry**	**Chemical industry**
Mean	2.68	2.42	1.82
Standard deviation	2.406	2.345	1.888
Range	0-10	0-11	0-11
Non-disclosing companies	3	13	13
Disclosing companies	44	60	60
Non-disclosing companies in %	6.4%	21.67%	21.67%
Disclosing companies in %	93.6%	78.33%	78.33%
Total number of companies	47	73	73

Mining companies present the highest number of disclosing companies, with only 3 non-disclosing companies. In electricity supply and chemical companies, the percentage in the number of disclosing companies drops by 16.27%. The results from table 6.1 indicate that the extent of environmental disclosure in Chinese mining, electricity and chemical industries is low; however, the mining industry performs the best overall.

Note that the ranges of initiatives reported are kept constant from 1 to 10 in mining industry and 1 to 11 in electricity supply and chemical industries. This suggests that there are some companies which choose to enhance their environmental reporting by following the GRI and achieved comparatively high scores of 10 and 11, although only 30 percent of the G3 disclosing items were reported. This again reflects the overall Chinese voluntary environmental disclosing level is typically low.

Environmental disclosure by categories

The GRI defines and classifies the thirty environmental disclosing items in terms of 9 categories, which are ‘materials’, ‘energy’, ‘water’, ‘biodiversity’, ‘emissions, effluents, and waste’, ‘products and services’, ‘compliance’, ‘transport’, and ‘overall’. Table 6.2 presents the environmental reporting of the extent of the disclosure by category for 2010 in the mining, electricity supply and chemical companies in China under a dichotomous index. Since the sample size in mining industry is different to electricity supply and chemical industry, quantity in percentage therefore provides a clear indication of the comparative extent of environmental. The number of disclosure is required to identify the quantity of environmental disclosure.

Table 6.2 is based on the results of figure 6.1; the results show that the mining industry has the highest percentage of companies disclosing (91.49%), followed by chemical (68.49%) and electricity supply (46.58%). One reason for the result could be the effect from EN1, which requires “identifying total materials used from external supplies and those from internal sources” (GRI, 2010). Mining companies are essentially the source suppliers and they dominate this item, which suggests that most of the mining companies have implemented this category well. In the energy category, the highest percentage of disclosing companies is by electricity supply companies (63.01%), followed by mining (44.68%) and chemical industries (39.73%).

Table 6.2

Environmental disclosure by category in Chinese mining, electricity supply and chemical companies

Category	% of Reporting Companies			No. of Disclosure			Mean Value			Std. Deviation			Range		
	M	E	C	M	E	C	M	E	C	M	E	C	M	E	C
EN1	91.49	43.84	68.49	43	32	50									
EN2	14.9	10.96	1.37	7	8	1									
Materials	**91.49**	**46.58**	**68.49**	**51**	**40**	**51**	**1.06**	**0.55**	**0.7**	**0.485**	**0.623**	**0.491**	**0-2**	**0-2**	**0-2**
EN3	12.77	8.22	12.33	6	6	9									
EN4	6.34	58.9	2.74	3	43	2									
EN5	14.9	20.55	5.48	7	15	4									
EN6	27.66	17.81	32.88	13	13	24									
EN7	14.9	10.96	2.74	8	8	2									
Energy	**44.68**	**63.01**	**39.73**	**37**	**85**	**41**	**0.77**	**1.16**	**0.56**	**1.220**	**1.310**	**0.799**	**0-5**	**0-5**	**0-3**
EN8	0	2.74	0	0	2	0									
EN9	0	0	0	0	0	0									
EN10	6.38	2.7	4.11	3	2	3									
Water	**6.38**	**5.5**	**4.11**	**3**	**4**	**3**	**0.06**	**0.05**	**0.04**	**0.247**	**0.228**	**0.200**	**0-1**	**0-1**	**0-1**
EN11	2.13	0	0	1	0	0									
EN12	0	1.37	0	0	1	0									
EN13	0	0	0	0	0	0									
EN14	2.13	0	0	1	0	0									
EN15	0	0	0	0	0	0									
Biodiversity	**4.26**	**1.37**	**0**	**2**	**1**	**0**	**0.04**	**0.01**	**0**	**0.204**	**0.116**	**0**	**0-1**	**0-1**	**0**
EN16	2.13	5.48	6.85	1	4	5									
EN17	0	4.11	4.11	0	3	3									
EN18	12.77	12.33	12.33	0	9	9									
EN19	12.77	0	2.74	6	0	2									
EN20	6.38	6.85	4.11	6	5	3									

Note: M represents mining industry; E represents electricity supply industry; C represents chemical industry

Table 6.2

Environmental disclosure by category in Chinese mining, electricity supply and chemical companies (Cont'd)

Category	No. of Disclosing Companies			No. of Disclosure			Mean Value			Std. Deviation			Range		
	M	E	C	M	E	C	M	E	C	M	E	C	M	E	C
EN21	4.26	1.37	0	3	1	0									
EN22	6.38	8.22	2.74	2	6	2									
EN23	2.13	0	0	3	0	0									
EN24	2.13	0	0	1	0	0									
EN25	0	1.37	0	0	1	0									
Emissions, Effluents and Waste	**21.28**	**21.92**	**15.07**	**16**	**29**	**24**	**0.34**	**0.4**	**0.33**	**0.668**	**0.934**	**1.001**	**0-3**	**0-5**	**0-5**
EN26	10.64	4.11	4.11	0	3	3									
EN27	0	0	1.37	5	0	1									
Products and Services	**10.64**	**4.11**	**4.11**	**5**	**3**	**4**	**0.11**	**0.04**	**0.05**	**0.312**	**0.199**	**0.229**	**0-1**	**0-1**	**0-1**
EN28	2.13	0	0	2	0	0									
Compliance	**2.13**	**0**	**0**	**2**	**0**	**0**	**0.02**	**0**	**0**	**0.146**	**0**	**0**	**0-1**	**0**	**0**
EN29	0	0	0	0	0	0									
Transport	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
EN30	27.66	15.07	12.33	13	11	9									
Overall	**27.66**	**15.07**	**12.33**	**13**	**11**	**9**	**0.28**	**0.15**	**0.12**	**0.452**	**0.358**	**0.33**	**0-1**	**0-1**	**0-1**

Note: M represents mining industry; E represents electricity supply industry; C represents chemical industry

Most electricity supply companies have disclosed the amount of energy they have generated and consumed by themselves and their users, and this amount is shown to be approximately at the same level across companies. EN4 requires disclosure indirect energy, such as electricity, heating and cooling, steam energy consumed from sources external to the reporting organization. Since this indicator includes the resources that electricity supply companies consume, the number of disclosure for this item is significantly higher than the other sample industries.

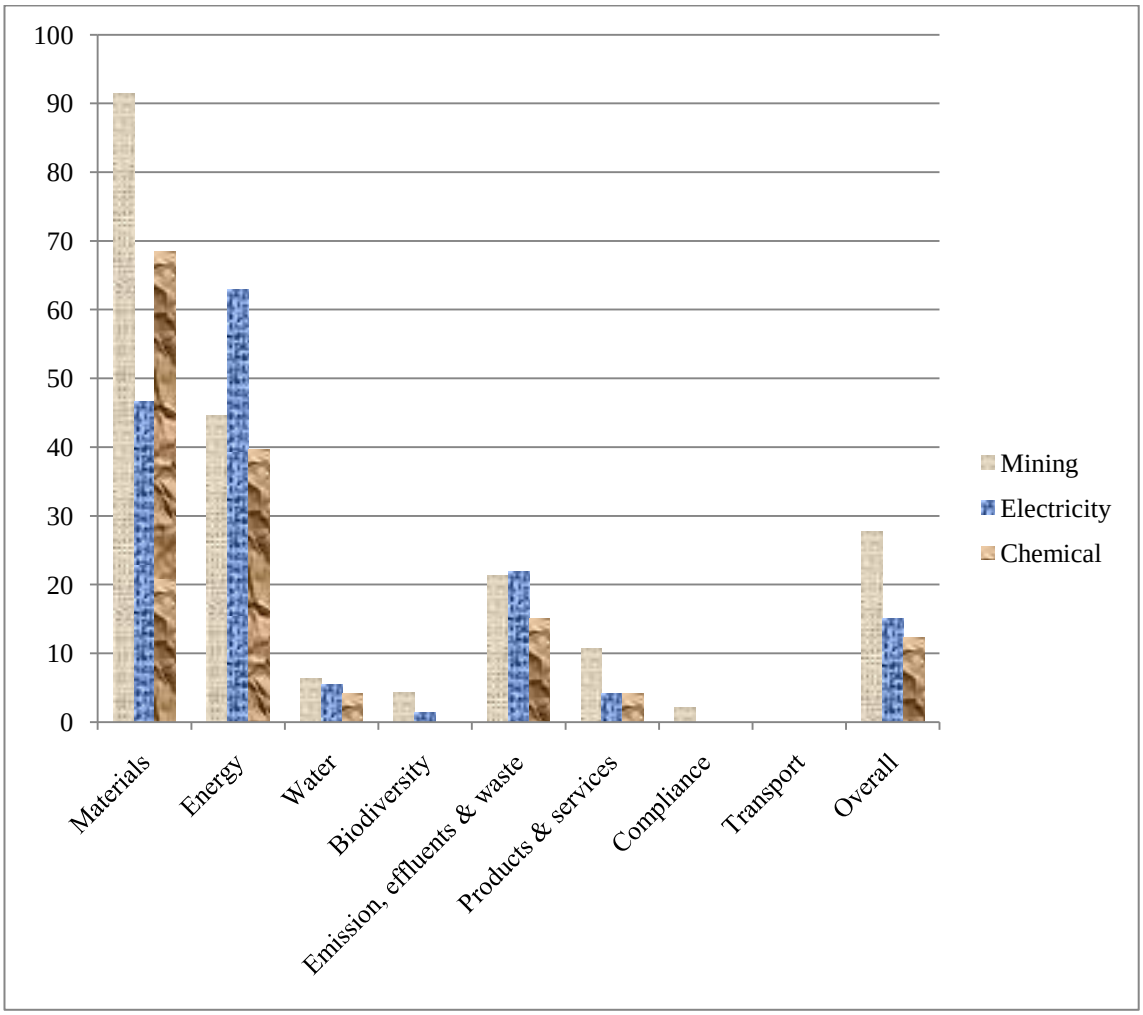


Figure 6.1

Total number of disclosing companies in mining, electricity supply and chemical companies in percentage

Another two categories worth mentioning are emissions and effluents and overall. Figure 6.1 shows that the levels of emissions (and effluents) across industries are similar. However, overall, which requires reporting total environmental protection expenditures and investments by type, the differences are more obvious. Mining obtains 27.66% in the number of disclosing companies; this is slightly higher than electricity supply (15.07%) and chemical firms (12.33%).

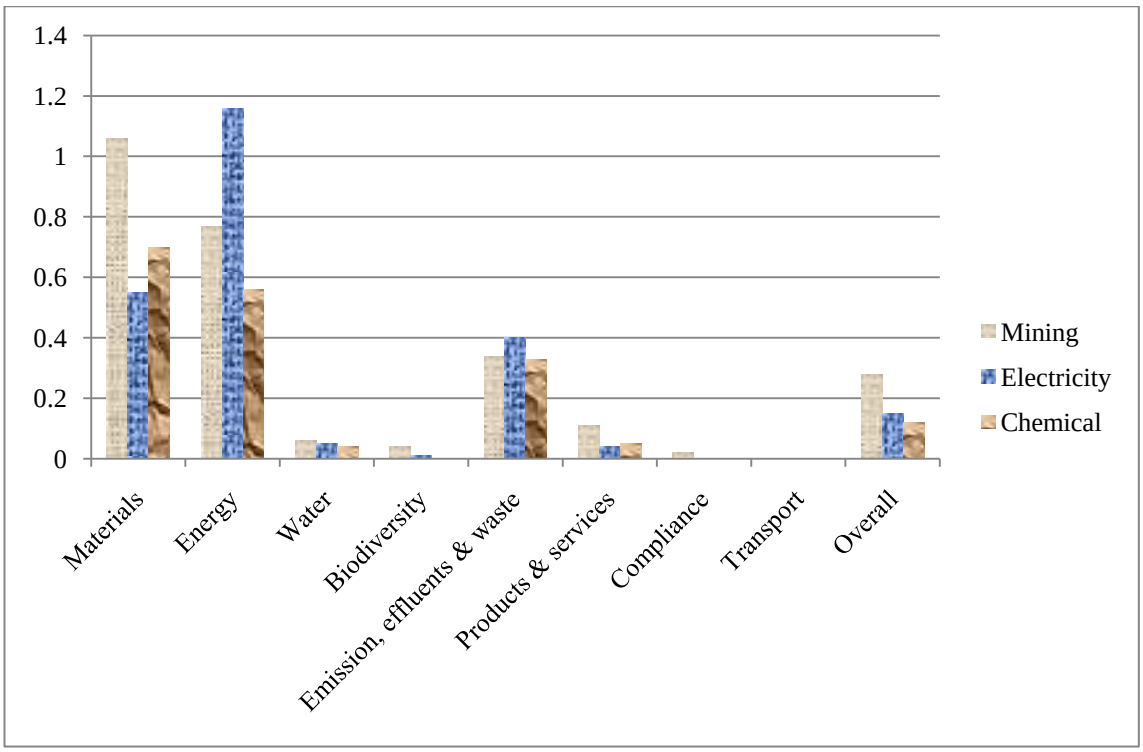


Figure 6.2
Average disclosures per company in mining, electricity supply and chemical industries

Figure 6.2 presents the average number of environmental disclosure by category in histogram. This result explains that the features of an industry, such as their business products, may be an indicator when analysing companies' environmental disclosures. For example, mining companies that produce prime resource for energy consumption are more likely to disclose materials related information, and this leads materials disclosures to be much higher than the other two sample industries. Likewise, most of the annual reports from electricity supply companies showed that they are the major energy suppliers, which result energy related disclosures to be higher than the other two industries. Notably, figures for other categories, such as water, biodiversity, product and services, compliance, transport and overall, present almost the same amounts of disclosure across industries in histograms. This suggests that the extent of disclosure of the G3 categories for companies' environmental disclosures remains approximately identical.

Most common reported categories

The most commonly reported categories by each sample industry are shown in table 6.3. The five most common reported categories selected because firstly, they are ranked top five in both percentage of disclosing companies and average disclosures per company in all industries. Further, these categories are reported and considered by most of the companies.

In the sample industries, the most common reported environmental performance categories were: materials, energy, emissions, effluents and waste, product and services and overall. Product and services is ranked quite low consistently across industries; however, materials is ranked one because it has high percentages in both mining and chemical companies. Interestingly, it is found that all three industries share the most common environmental categories.

Table 6.3

Top 5 GRI environmental categories

Mining industry **GRI performance category**	**Rank (% of companies disclosing)**	**Rank (Average no. of disclosures)**
Materials (EN1-EN2)	1 (91.49%)	1 (1.06)
Energy (EN3-EN7)	2 (44.68%)	2 (0.77)
Overall (EN30)	3 (27.66%)	4 (0.28)
Emission, effluents and waste (EN16-25)	4 (21.28%)	3 (0.34)
Product and services (26-27)	5 (10.64%)	5 (0.11)

Electricity supply industry **GRI performance category**	**Rank (% of companies disclosing)**	**Rank (Average no. of disclosures)**
Energy (EN3-EN7)	1 (63.01%)	1 (0.77)
Materials (EN1-EN2)	2 (46.58%)	2 (0.55)
Emission, effluents and waste (EN16-25)	3 (21.92%)	3 (0.4)
Overall (EN30)	4 (15.07%)	4 (0.15)
Product and services (26-27)	5 (4.11%)	5 (0.04)

Chemical industry **GRI Performance Category**	**Rank (% of companies disclosing)**	**Rank (Average no. of disclosures)**
Materials (EN1-EN2)	1 (68.49%)	1 (0.7)
Energy (EN3-EN7)	2 (39.73%)	2 (0.56)
Emission, effluents and waste (EN16-25)	3 (15.07%)	3 (0.33)
Overall (EN30)	4 (12.33%)	4 (0.12)
Product and services (26-27)	5 (4.11%)	5 (0.05)

Most common indicators for GRI environmental performance

There are common environmental indicators reported among companies and industries. The rank order of the thirty GRI environmental indicators in all three industries is presented in table 6.4. The percentage provides a rank position for each indicator into quantity that companies disclosed in their annual reports. As can be seen from the table, EN1 was the most reported indicator in both the mining and chemical industries and the second most reported indicator in the electricity supply industry in the 2010 financial year. This indicator requires companies to disclose “direct material used” and “materials used by weight or volume” (GRI, 2010, p.28). There are 43, 32 and 50 companies which disclosed EN1 in mining, electricity supply and chemical industries respectively.

There are another 6 initiatives considered to be common indicators because they are ranked within the top 12 across all three industries. These items are: EN30, environmental expenditure or investment by type; EN6, energy-efficient or renewable energy based products and services and reductions in energy requirements as a result of this; EN5, which requires to report energy saved due to conservation and efficiency improvements; EN18, reduced greenhouse gas emissions and reductions achieved; EN3, direct energy consumption by primary source; and EN20, air emissions such as nitric oxide and sulphur monoxide and other significant gases.

The remaining indicators are not considered to be important in terms of the number of disclosing companies in percentage and the average number of disclosures per company. Several companies recorded disclosing items of 5% or less, while several had no disclosure. This may be influenced by the disclosing manner of the sample companies, where they are less likely to disclose the items that are not popular and not commonly disclosed by the big companies.

Table 6.4

Rank of the GRI environmental indicators

Mining industry				**Electricity supply industry**				**Chemical industry**			
Rank	**GRI indicator**	**% of firms disclosing**	**Average no. of disclosures**	**Rank**	**GRI indicator**	**% of firms disclosing**	**Average no. of disclosures**	**Rank**	**GRI indicator**	**% of firms disclosing**	**Average no of disclosures**
1	EN1	91.49	0.91	1	EN4	58.9	0.59	1	EN1	68.49	0.68
2	EN30	27.66	0.28	2	EN1	43.84	0.44	2	EN6	32.88	0.33
2	EN6	27.66	0.28	3	EN5	20.55	0.21	3	EN3	12.33	0.12
4	EN5	14.9	0.15	4	EN6	17.81	0.18	3	EN30	12.33	0.12
4	EN7	14.9	0.15	5	EN30	15.07	0.15	3	EN18	12.33	0.12
6	EN2	14.9	0.13	6	EN18	12.33	0.12	6	EN16	6.85	0.07
6	EN18	12.77	0.13	7	EN2	10.96	0.11	7	EN5	5.48	0.05
8	EN3	12.77	0.13	7	EN7	10.96	0.11	8	EN10	4.11	0.04
9	EN26	10.64	0.11	9	EN3	8.22	0.08	8	EN26	4.11	0.04
9	EN22	6.38	0.06	9	EN22	8.22	0.08	8	EN20	4.11	0.04
9	EN20	6.38	0.06	11	EN20	6.85	0.07	8	EN17	4.11	0.04
9	EN10	6.38	0.06	12	EN16	5.48	0.05	12	EN22	2.74	0.03
13	EN4	6.38	0.06	13	EN17	4.11	0.04	12	EN19	2.74	0.03
14	EN21	4.26	0.04	13	EN26	4.11	0.04	12	EN7	2.74	0.03

Table 6.4

Rank of the GRI environmental indicators (Cont'd)

Mining industry				**Electricity supply industry**				**Chemical industry**			
Rank	**GRI indicator**	**% of firms disclosing**	**Average no. of disclosures**	**Rank**	**GRI indicator**	**% of firms disclosing**	**Average no. of disclosures**	**Rank**	**GRI indicator**	**% of firms disclosing**	**Average no. of disclosures**
14	EN23	2.13	0.02	15	EN8	2.74	0.03	12	EN4	2.74	0.03
14	EN14	2.13	0.02	15	EN10	1.37	0.03	16	EN27	1.37	0.01
14	EN28	2.13	0.02	17	EN25	1.37	0.01	17	EN2	1.37	0.01
14	EN16	2.13	0.02	17	EN21	1.37	0.01	18	EN29	0	0
14	EN11	2.13	0.02	17	EN12	1.37	0.01	18	EN28	0	0
20	EN29	0	0	20	EN29	0	0	18	EN25	0	0
20	EN27	0	0	20	EN28	0	0	18	EN24	0	0
20	EN25	0	0	20	EN27	0	0	18	EN23	0	0
20	EN24	0	0	20	EN24	0	0	18	EN21	0	0
20	EN19	0	0	20	EN23	0	0	18	EN15	0	0
20	EN17	0	0	20	EN19	0	0	18	EN14	0	0
20	EN15	0	0	20	EN15	0	0	18	EN13	0	0
20	EN13	0	0	20	EN14	0	0	18	EN12	0	0
20	EN12	0	0	20	EN13	0	0	18	EN11	0	0
20	EN9	0	0	20	EN11	0	0	18	EN9	0	0
20	EN8	0	0	20	EN9	0	0	18	EN8	0	0

Discussion of results

The results from previous sections indicate and demonstrate the extent of voluntary environmental reporting across mining, electricity supply and chemical industries in China through descriptive statistics.

By looking at the total average quantity of companies' environmental disclosures in annual reports, mining industry discloses more than electricity supply industry and chemical industry by 0.26 and 0.86 disclosures respectively. This shows that mining industries disclose more environmental information in quantity than the electricity supply and chemical industries. Mining enterprises often have a direct dependence on natural resources, which in most cases are non-renewable (Shen, Zhang, Chen & Liu, 2012). The Ministry of environmental protection of China considers a number of factors when measuring a company is performing environmentally responsibly, such as coal production geological reserves, economically recoverable reserves, the remaining recoverable reserves, fine coal recovery rates and actions that companies take for environmental protection (Ministry of Environmental Protection of People's Republic of China, n.d.). Since mining companies take the most concerns of natural resources, it is more likely to obtain a higher extent of environmental disclosures in their annual reports. The electricity supply and chemical companies are secondary consumers' of natural resources and are more likely to exert less environmental pressure than the mining industry under this criteria (Xia & Li, 2010), therefore they have less environmental disclosures in quantity. Nonetheless, there was little difference across the industries in environmental reporting. This concludes that the environmental reporting for mining, electricity supply and chemical companies were relatively at the same extent.

Compared across industries, the most common categories of disclosed environmental information in companies' annual reports were materials, energy, overall and emissions, effluents and wastes, which are considered to be the most important by the majority of the sample companies. These categories also include the common environmental disclosing initiative such as EN1, EN3, EN5, EN6, EN18, EN20 and EN30. One reason for these categories being important is that the Chinese government issued the 11th Five Years Sustainable Plan in 2006, which is also called CPC Central Committee's Recommendations on the Formulation of the Eleventh Five-Year Plan for National Economic and Social Development. A specific section concerning national sustainability is included in this plan, where environmental suggestions are given to companies. This section encourages companies to specifically disclose their uses and

consumptions of resources in relevant business activities. A number of the sample companies emphasised that they have taken considerations of the suggestions that this plan provides. Therefore, since companies were encouraged to disclose materials and energy used and consumed during business processes and productions, it explains that mining companies and electricity supply companies were more likely to disclose materials and energy related information. However, it is completely voluntary, so no information on compulsory disclosing requirements could be found in this plan. Hence, it is found that the amount of environmental information that mining, electricity supply and chemical companies disclose is very likely to be influenced by government policies, no matter if it is voluntary.

As presented in previous sections, mining companies have slightly higher extent of environmental disclosures overall than electricity supply and chemical companies; however, the extent of environmental disclosures is almost identical. Since the extent of environmental reporting was measured in quantity which does not explain the quality perspective, it concludes that mining companies disclose sightly more environmental information than electricity and chemical companies in quantity, whereas chemical companies disclose the least amount.

Instead of disclosing GRI environmental information in detail, over 70% of the sample companies chose to only briefly mention their general environmental performances. Although a large number of percentages can be obtained, more than 50% of the companies reported the indicators by one or two sentences. Therefore, it is hard to obtain environmental information in detail in companies' annual reports because they are not willing to disclose in detail.

Summary

This chapter has shown, analysed and discussed the results from environmental disclosure analysis in this study across Chinese mining, electricity supply and chemical companies in 2010. The next chapter will analyse and discuss the results from social disclosure analysis across the sample industries thereby completing the remaining part of the first research question.

CHAPTER 7

SOCIAL DISCLOSURE ANALYSIS

Introduction

This chapter presents voluntary social disclosure analysis using the research methodology and the approach outlined in chapter 5. As the quantitative aspect of social disclosures were analysed, descriptive statistics were applied first to measure the extent and type of companies 'social reporting using the GRI (G3) for all industries in the sample.

Level of social reporting

The descriptive statistics of the level of social disclosures are displayed in table 7.1. It shows a comparison across the industries in terms of the mean, standard deviation, range, as well as the number and percentages of disclosing or non-disclosing companies. The mean value refers to the number of disclosures per company.

In respect of the percentage of the number of disclosing companies, all three industries have 100 percentage disclosing rate, which means there was at least one item disclosed by the sample companies. In addition, LA1, LA10, LA12 and HR3 require companies to disclose the number of employees or workforces that they have. As the entire sample companies have disclosed information included in these items, the disclosing rate remains high.

Social information reported by sample firms was general and did not include specific detail relating to their actual corporate social performances. As table 7.1 presents, electricity supply industry has the highest mean value, where averages of 5.55 social GRI indicators were obtained from companies annual reports. This is followed by the mining industry, then chemical industry, in which 5.49 and 4.96 disclosures were shown in annual reports.

These results show that the extent of social disclosure in the sample companies across industries is similar but remain typically low. This is because there are 40 disclosing items listed in the G3 social indicators and only on an average of 5.49 were disclosed in mining industry, 5.55 were disclosed in electricity supply industry and 4.96 were

disclosed in chemical industry. As table 7.1 demonstrates, the amount of social disclosure across industry is slightly different, where the mean value for mining industry and electricity supply industries are almost identical.

Table 7.1

Descriptive statistics for mining, electricity supply and chemical companies' social disclosures

	Mining industry	**Electricity supply industry**	**Chemical industry**
Mean	5.49	5.55	4.96
Standard deviation	1.921	2.028	1.086
Range	4-15	4-14	4-9
Non-disclosing companies	0	0	0
Disclosing companies	47	73	73
Non-disclosing companies in %	0%	0%	0%
Disclosing companies in %	100%	100%	100%
Total number of companies	47	73	73

In addition, the range for social disclosures for all industries has a minimum of 4 and a maximum of 15 for mining industry, 14 for electricity supply industry and 9 for chemical industry; however, the mean values are not much more than the minimum of their range. Therefore, the social reporting performances from sample industries are not high, and they remain approximately the same across industries.

Social disclosure by categories

There are forty social disclosure items in terms of 4 aspects in the GRI. Theses aspects are namely 'Labour Practice and Decent work', 'Human Rights', 'Society' and 'Product Responsibility'. Table 7.2 presents the extent for social reporting by category in the mining, electricity supply and chemical companies in China under a dichotomous index. The number of disclosing companies is considered in the descriptive statistics because the sample size in each industry is different, quantity in percentage provides a clearer approach in terms of comparing mining, electricity supply and chemical companies. The number of disclosure is required to identify the quantity of social disclosure. Figure 7.1 that describes the average number of disclosures shows although there are differences of social disclosure in the quantity reported, the outcomes are shown to be slightly different.

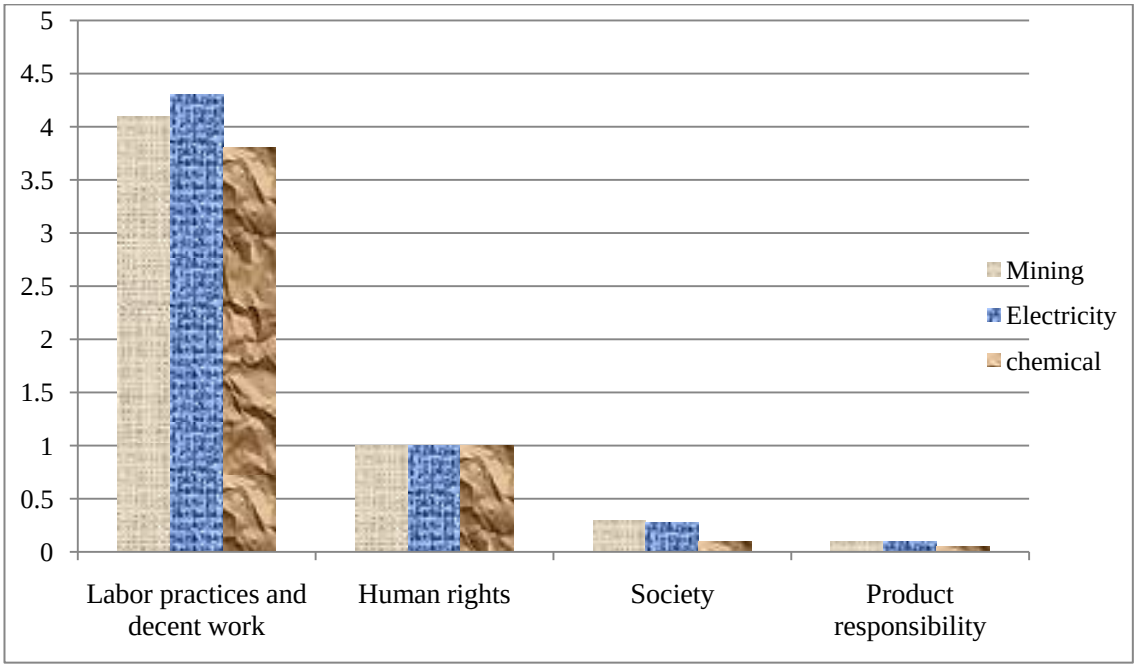


Figure 7.1

Average social disclosures per company in mining, electricity supply and chemical industries by categories.

Table 7.2

Social disclosure by category in Chinese mining, electricity supply and chemical companies

Category	**No. of Disclosing Companies in%**			**No. of Disclosure**			**Mean Value**			**Std. Deviation**			**Range**		
	M	**E**	**C**	**M**	**E**	**C**	**M**	**E**	**C**	**M**	**E**	**C**	**M**	**E**	**C**
LA1	100	100	100	47	73	73									
LA2	25.53	28.76	82.19	12	21	6									
LA3	12.76	32.87	28.76	6	24	21									
LA4	0	2.73	8.21	0	2	6									
LA5	0	0	0	0	0	0									
LA6	4.25	5.47	0	2	4	0									
LA7	14.89	4.10	2.73	7	3	2									
LA8	4.25	5.47	0	2	4	0									
LA9	21.27	3.15	1.50	10	23	11									
LA 10	97.87	100	98.63	46	73	72									
LA11	23.40	13.69	21.91	11	10	16									
LA12	1	95.89	100	47	70	73									
LA13	2.12	1.36	0	1	1	0									
LA14	0	0	0	0	0	0									
Labor and decent work	**100**	**100**	**100**	**191**	**313**	**278**	**4.06**	**4.29**	**3.81**	**1.241**	**1.448**	**0.967**	**3-10**	**3-9**	**2-6**

Note: M represents mining industry; E represents electricity supply industry; C represents chemical industry

Table 7.2

Social disclosure by category in Chinese mining, electricity supply and chemical companies (Cont'd)

Category	No. of Disclosing Companies in%			No. of Disclosure			Mean Value			Std. Deviation			Range		
	M	E	C	M	E	C	M	E	C	M	E	C	M	E	C
HR1	0	1.36	0	0	1	0									
HR2	0	0	0	0	0	0									
HR3	100	100	100	47	73	73									
HR4	0	0	0	0	0	0									
HR5	0	0	0	0	0	0									
HR6	0	0	0	0	0	0									
HR7	2.12	0	0	1	0	0									
HR8	0	0	0	0	0	0									
HR9	0	0	0	0	0	0									
Human Rights	**100**	**100**	**100**	**48**	**74**	**73**	**1.02**	**1.01**	**1**	**0.146**	**0.117**	**0.117**	**1-2**	**1-2**	**1-1**
SO1	0	0	1.36	0	0	1									
SO2	2.12	1.36	0	1	1	0									
SO3	0	0	0	0	0	0									
SO4	0	0	0	0	0	0									
SO5	0	0	0	0	0	0									
SO6	17.02	13.69	5.47	8	10	4									
SO7	0	0	0	0	0	0									
SO8	0	5.47	2.73	0	4	2									
Society performance	**19.15**	**31.91**	**8.22**	**11**	**15**	**7**	**0.23**	**0.21**	**0.10**	**0.520**	**0.407**	**0.340**	**0-2**	**0-1**	**0-2**

Note: M represents mining industry; E represents electricity supply industry; C represents chemical industry

Table 7.2

Social disclosure by category in Chinese mining, electricity supply and chemical companies (Cont'd)

Category	No. of Disclosing Companies in%			No. of Disclosure			Mean Value			Std. Deviation			Range		
	M	E	C	M	E	C	M	E	C	M	E	C	M	E	C
PR1	0	1.36	0	0	1	0									
PR2	0	0	0	0	0	0									
PR3	0	0	1.36	0	0	1									
PR4	0	0	0	0	0	0									
PR5	4.25	4.10	1.36	2	3	1									
PR6	0	4.10	2.73	0	3	2									
PR7	0	0	0	0	0	0									
PR8	0	0	0	0	0	0									
PR9	0	0	0	0	0	0									
Product responsibility	**4.25**	**8.51**	**2.74**	**3**	**7**	**4**	**0.11**	**0.1**	**0.05**	**0.429**	**0.446**	**0.369**	**0-2**	**0-3**	**0-3**

Note: M represents mining industry; E represents electricity supply industry; C represents chemical industry

The results from the study indicate that the extent of voluntary social disclosure in terms of 4categories reported across industries differ slightly. In the labour practices and decent work category, although all industries obtain almost the same disclosing rate, electricity supply industry has the highest average number of disclosures among the three with 4.29 disclosures per company. Mining companies retained 5.36% less disclosures in comparison with the electricity supply industry, and there are 4.06 social disclosures per mining company. Chemical companies have the lowest average number of disclosure with 3.81 disclosures per company. This shows that the social reporting practices are very much similar across industries in terms of the categories under the GRI because the social items disclosed in quantity are approximately equivalent.

Most common reported social categories

The most commonly reported categories by each sample industry are shown in table 7.3.The four categories are ranked in terms of percentage of companies' disclosure and the mean value, which is the average number of disclosures per company.

In the sample industries, the most common reported social performance categories were "labour practices and decent work" and "human rights". "Product responsibility" is ranked quite low consistently among the sample industries.

Table 7.3

Common GRI social categories

Mining industry **GRI performance category**	**Rank (% of companies disclosing)**	**Rank (Average no. of disclosures)**
Labor practice and decent Work (LA)	1 (100%)	1 (4.06)
Human rights (HR)	2 (100%)	2 (1.02)
Society performance (SO)	3 (19.15%)	3 (0.23)
Product responsibility (PR)	4 (4.25%)	3 (0.06)

Table 7.3

Common GRI social categories (Cont'd)

Electricity Supply industry GRI performance category	**Rank (% of companies disclosing)**	**Rank (Average no. of disclosures)**
Labor practice and decent work (LA)	1 (100%)	1 (4.29)
Human rights (HR)	2 (100%)	2 (1.01)
Society performance (SO)	3 (19.15%)	3 (0.21)
Product responsibility (PR)	4 (4.25%)	3 (0.1)

Chemical industry GRI performance category	**Rank (% of companies disclosing)**	**Rank (Average no. of disclosures)**
Labor Practice and decent Work (LA)	1 (100%)	1 (3.81)
Human rights (HR)	2 (100%)	2 (1)
Society performance (SO)	3 (19.15%)	3 (0.1)
Product responsibility (PR)	4 (4.25%)	3 (0.05)

Most common indicators for GRI social performance

There are common social indicators reported among industries. The rank orders of the forty GRI social indicators in all three industries are presented in table 7.4. The percentages provide a rank position for each indicator into quantity that companies disclosed in annual reports. As can be seen from the table, LA1, LA10, LA3 and HR3 were the most reported indicators in all three sample industries. LA1 requires reporting total workforce by employment type, employment contract, and region, broken down by gender; LA 10 requires to disclose average hours of training per year per employee by gender and by category; LA 3 requires companies to present "benefits provided to full-time employees that are not provided to temporary or part-time employees, by significant locations of operation" (GRI, 2010, p.31); HR3 requires companies to "disclose total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained" (GRI, 2010, p.35). Notably, to comply with these initiatives, companies need to report the number of employees or workforces in categories. This is very well implemented and reported by most of the sample companies.

The second most common indicators were LA2 and LA12. LA2 requires reporting total number and rate of new employee hires and employee turnover by age group, gender and region; LA12 requires reporting percentage of employees receiving regular performance and career development reviews, by gender (GRI, 20010, p.35). Notably, most of these common indicators are from the labour practices and decent work category.

These top 6 initiatives (LA1, LA2, LA3, LA10, LA13 and HR 3) are considered to be the most important by the sample companies. The remaining indicators are not considered to be as important as they were performed not so well in terms of the number of disclosing companies in percentage and the average number of disclosures per company.

Table 7.4

Rank of the GRI social indicators

Mining industry				**Electricity supply industry**				**Chemical industry**			
Rank	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**	**Rank**	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**	**Rank**	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**
1	LA1	100	1	1	LA1	100	1	1	LA1	100	1
1	HR3	100	1	1	LA10	100	1	1	LA12	100	1
1	LA12	100	1	1	HR3	100	1	1	HR3	100	0.98
4	LA10	97.87	0.98	4	LA12	95.89	0.96	4	LA10	98.63	0.26
5	LA2	25.53	0.26	5	LA3	32.87	0.33	5	LA2	82.19	0.23
6	LA11	23.4	0.23	6	LA2	28.76	0.29	6	LA3	28.76	0.21
7	LA9	21.27	0.21	7	LA11	13.69	0.14	7	LA11	21.91	0.17
8	SO6	17.02	0.17	7	SO6	13.69	0.14	8	LA4	8.21	0.15
9	LA7	14.89	0.15	9	LA6	5.47	0.55	9	SO6	5.47	0.13
10	LA3	12.76	0.13	9	LA8	5.47	0.55	10	LA7	2.73	0.04
11	LA6	4.25	0.04	9	SO8	5.47	0.55	10	SO8	2.73	0.04
11	LA8	4.25	0.04	12	LA7	4.1	0.04	10	PR6	2.73	0.04
11	PR5	4.25	0.04	12	PR5	4.1	0.04	13	LA9	1.5	0.02
14	LA13	2.12	0.02	12	PR6	4.1	0.04	14	SO1	1.36	0.02

Table 7.4

Rank of GRI social indicators (Cont'd)

Mining industry				**Electricity supply industry**				**Chemical industry**			
Rank	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**	**Rank**	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**	**Rank**	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**
14	HR7	2.12	0.02	15	LA9	3.15	0.03	14	PR3	1.36	0.02
16	SO2	1	0.01	16	LA4	2.73	0.03	14	PR5	1.36	0.01
17	LA4	0	0	17	LA13	1.36	0.01	17	LA5	0	0
17	LA5	0	0	17	HR1	1.36	0.01	17	LA6	0	0
17	LA14	0	0	17	SO2	1.36	0.01	17	LA8	0	0
17	HR1	0	0	17	PR1	1.36	0.01	17	LA13	0	0
17	HR2	0	0	21	LA5	0	0	17	LA14	0	0
17	HR4	0	0	21	LA14	0	0	17	HR1	0	0
17	HR5	0	0	21	HR2	0	0	17	HR2	0	0
17	HR6	0	0	21	HR4	0	0	17	HR4	0	0
17	HR8	0	0	21	HR5	0	0	17	HR5	0	0
17	HR9	0	0	21	HR6	0	0	17	HR6	0	0
17	SO1	0	0	21	HR7	0	0	17	HR7	0	0
17	SO3	0	0	21	HR8	0	0	17	HR8	0	0
17	SO4	0	0	21	HR9	0	0	17	HR9	0	0
17	SO5	0	0	21	SO1	0	0	17	SO2	0	0

Table 7.4

Rank of GRI social indicators (Cont'd)

Mining industry				**Electricity supply industry**				**Chemical industry**			
Rank	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**	**Rank**	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**	**Rank**	**GRI indicator**	**% of companies disclosing**	**Average number of disclosures**
17	SO7	0	0	21	SO3	0	0	17	SO3	0	0
17	SO8	0	0	21	SO4	0	0	17	SO4	0	0
17	PR1	0	0	21	SO5	0	0	17	SO5	0	0
17	PR2	0	0	21	SO7	0	0	17	SO7	0	0
17	PR3	0	0	21	PR2	0	0	17	PR1	0	0
17	PR14	0	0	21	PR3	0	0	17	PR2	0	0
17	PR6	0	0	21	PR4	0	0	17	PR4	0	0
17	PR7	0	0	21	PR7	0	0	17	PR7	0	0
17	PR8	0	0	21	PR8	0	0	17	PR8	0	0
17	PR9	0	0	21	PR9	0	0	17	PR9	0	0

Discussion of results

This chapter presented the extent of social disclosure in mining, electricity supply and chemical industries in quantity, where the extent of social disclosure in terms of categories and common reported indicators were specifically analysed. From a broad overview, the amount of social disclosures across industries is only slightly different. Disclosures from electricity supply industry are higher than the mining and chemical companies by 0.06 and 0.59 respectively, where chemical industry reported the least number of social disclosures. These results indicate that all three industries were still at the same extent of their social reporting, although electricity supply industry performed slightly better than the other industries in terms of quantity. This suggests that although the sample industries are different in terms of business products and operation processes, they belong to the environment sensitive sector, and the results show that the amount of disclosed information to be similar to one another. Interestingly, the reporting rates for all industries were 100 percent; it means that there was at least one disclosure in every sample company's annual report. These reporting rates suggest that social information may have become one of the major concerns for all industries. Companies were willing to disclose some social information, although the amount of this information is considerably little.

Results from most common reported categories showed that labour practice and decent work and human rights are the most reported categories across industries. These categories also received 100 percent reporting rate but society performance and product responsibility were reported only by less than 20 percent and 5 percent respectively. Meanwhile, the most commonly reported indicators were concerned with employee numbers, welfare and safety checks (LA1, LA2, LA3, LA7, LA10 and HR3). Workforces are considered by the public as the wealth creators in enterprises and the extent of welfare that they receive often reflects their social positions, which plays an important role encouraging workers' enthusiasm and creativity in everyday business operating process (Zhang, 2012). The current level of welfare for labours from environmental sensitive industries and heavy polluting industries are generally low, in particular workers in the mining industries and electricity supply industries and the welfare that they receive, are becoming one of the most debatable issues in public (Tan, 2012). Environmental and social sensitive companies reporting this piece of information may obtain and establish sound social image because it is the most concerned issues by

the public. Hence, companies prefer to disclose social information that is directly linked with the public's concerns.

In respect of workforces' safety, a large proportion of the sample companies have disclosed how they managed employees' safety. However, disclosures obtained from mining industry were small. This is because most of the mining companies in China operate underground in deep geological formations. Although mine accidents caused by the threat of natural disasters are now avoided scientifically, there were still deaths reported by a few companies in 2010. The results indicate that companies were willing to disclose their performances on labour and human rights to some extent, but most of the sample companies were reluctant to disclose such information in detail across mining, electricity supply and chemical industries.

In conclusion, mining, electricity supply and chemical industries disclosed relatively similar amount of social information in their 2010 annual reports, and the contents of their disclosures were not very much different. The sample companies preferred to reported general social information that was concerned by the public. Although the labour and decent work and human rights aspects were reported by all sample companies, information disclosed is limited and does not show a high extent of social information because of the small number of disclosure. Therefore, most companies in the three industries in this study are still not willing to disclose their social issues and performances in detail in their 2010 annual reports.

Summary

In the chapter, the results from social disclosure analysis of Chinese mining, electricity supply and chemical industries in 2010 were presented, analysed and discussed. The next chapter will present the results obtained from univariate and multivariate analysis of the hypotheses formulated in Chapter 4 thereby completing part of the second research question.

CHAPTER 8

REGRESSION RESULTS ANALYSIS IN ENVIRONMENTAL DISCLOSURES

Introduction

This chapter discusses and presents the outcomes of the statistical analysis of the hypotheses formulated in Chapter 4 and the research methodology described in Chapter 5. In accordance with the results, the associations between firm specific characteristics and the extent of environmental disclosures are interpreted under the legitimacy theoretical framework. Therefore, this chapter answers the third research question regarding making comparison and discussion of the determinants of in environmental disclosures between the sample industries.

Descriptive statistics

Descriptive statistics were firstly employed to determine the central tendency and the distribution of the variables. This is a crucial and important process because multiple regressions analysis is based on the assumptions of normality, independence of errors, constant variance of error terms and non-collinearity. A number of indicators were collected, such as the mean, median, standard deviation, skewness and kurtosis.

Test of normality

Data normality is one of the major assumptions for most statistical analyses. Normality can be measured in a number of ways both graphically and non-graphically (Stevens, 1992). Stevens (1992) stated that non-graphical measures are more convincing in terms of interpreting data normality, such as the combination of Kolmogorov-Smirnov and Shapiro-Wilk tests that are often treated as the most powerful in detecting data normality. As there are three subsets (mining, electricity supply and chemical industries) for this study and each subset has a sample size less than a hundred, normality can be determined by Kolmogorov-Smirnov and Shapiro-Wilk tests. Alternatively, data normality can also be tested by observing the skewness or conducting a kurtosis test. The Kolmogorov-Smirnov statistic with a Lilliefors significance level for testing normality is often produced with the normal probability

and probability plots (Coakes et al., 2010). Data is recognized as normally distributed when the significance level is greater than 0.5, and they are acceptable if it approaches 0.5. This can be confirmed by skewness and kurtosis test also, where skewness is acceptable when it falls between -1 and 1, and kurtosis falls between -2 and 2 (Coakes et al., 2010).

Descriptive statistics for mining industry

Table 8.1 presents the distributions for the dependent and independent variables for the mining industry; it is apparent that most of the data departs from the normality. Variables MNGR (independent director ratio), AGE (company age), company size (total asset), profitability (net income/total asset), leverage (total liability/total asset) and total environmental disclosures (under GRI) were determined employing mean, median, standard deviation, skewness and kurtosis. From a graphical approach in terms of normality, the means for all variables, except company size, approach the medians, and datasets can be seen as close to normal distribution. However, by looking at the skewness and kurtosis, the results show that the distributions of all variables were too peaked particularly the variables SIZE and PROF. Although LEV and TOTAL(E) approach the normality, the distributions for these variables cannot be considered as acceptable. In addition, for further indications from results of the non-graphic tests, Kolmogorov-Smirnov and Shapiro-Wilk test show that data departs from normality as the p-values (significance) go below 0.05 (see table 8.2). Variables AGE and LEV can be considered as normally distributed in this test, although they do not show classic normal distribution. Coakes et al., (2010) indicates that variables can be considered as normally distributed when skewness and Kolmogorov-Smirnov approaches -1 to 1 or 0.05. However, both graphic and non-graphic tests confirmed that data for other variables departs from normality.

Table 8.1

Descriptive statistics for mining industry – raw data (environmental disclosure)

Variable	Mean	Median	Std. Deviation	Skewness	Kurtosis
MNGR	0.37	0.36	0.049	1.132	0.887
AGE	8.26	8	4.651	0.081	-1.229
SIZE$(m)	4.70	8.20	1.988	6.509	43.51
PROF(%)	0.10	0.08	0.095	2.896	12.72
LEV(%)	0.81	0.73	0.660	1.277	1.741
TOTAL(E)	2.68	2	2.406	1.480	1.839

Note: N = 47

Table 8.2

Test of normality for mining industry - raw data (environmental disclosure)

	Kolmogorov-Smirnov		Shapiro-Wilk	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.231	0.000*	0.859	0.000*
AGE	0.141	0.020*	0.943	0.024*
SIZE	0.424	0.000*	0.214	0.000*
PROF	0.173	0.001*	0.757	0.000*
LEV	0.131	0.042*	0.886	0.000*
TOTAL(E)	0.228	0.000*	0.816	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Descriptive statistics for electricity supply industry

The results in descriptive statistics for electricity supply industry show that only a few variables can be considered as approaching normality. Likewise, variables MNGR, AGE, company size, profitability, leverage and total environmental disclosures were determined employing mean, median, standard deviation, skewness and kurtosis. From a graphic approach, MNGR, AGE, LEV and TOTAL(E) can be considered to be normally distributed (see table 8.2). However, the dependent variable, TOTAL(E) fails the skewness test as the value 1.384 exceeds the acceptable range, which is from -1 to 1. SIZE, PROF and TOTAL(E), therefore, are required to be transformed in order to become normally distributed and satisfy the assumptions in the regressions test.

Furthermore, this can be indicated from the Kolmogorov-Smirnov and Shapiro-Wilk tests having the p value less than 0.05 (see Table 8.4). Skewness and kurtosis indicate that MNGR, AGE and LEV can be exceptional and considered as normally distributed. A descriptive statistics table also shows the other variables are too peaked, which confirms that all data are not classical normally distributed.

Table 8.3

Descriptive statistics for electricity supply industry – raw data (environmental disclosure)

Variable	**Mean**	**Median**	**Std. Deviation**	**Skewness**	**Kurtosis**
MNGR	0.37	0.33	0.091	0.535	5.822
AGE	11.82	13	4.366	-0.791	0.090
SIZE$(m)	9.74	3.78	2.002	6.043	42.805
PROF(%)	0.03	0.03	0.619	-1.930	14.050
LEV(%)	1.05	0.71	1.456	-0.404	1.782
TOTAL(E)	2.42	2	2.345	1.384	1.830

Note: N = 73

Table 8.4

Test of normality for electricity supply industry - raw data (environmental disclosure)

	Kolmogorov-Smirnov		**Shapiro-Wilk**	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.264	0.000*	0.853	0.000*
AGE	0.157	0.000*	0.929	0.000*
SIZE	0.329	0.000*	0.386	0.000*
PROF	0.181	0.001*	0.774	0.000*
LEV	0.224	0.000*	0.760	0.000*
TOTAL(E)	0.216	0.000*	0.849	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Descriptive statistics for chemical industry

Similarly, the methods in the previous sections were applied to test the chemical industry and variables MNGR, AGE, company size, profitability, leverage and total environmental disclosures were examined. The results show that most of the variables depart from normality (see table 8.5). In particular, SIZE, PROF LEV and the dependent variable TOTAL(E) failed both the skewness and kurtosis tests, although

their mean values approached the medians. MNGR and AGE are considered as normal, because first, their means approach the medians (3.18 approaches to 3, and 8.82 approach 10), and they satisfy the skewness and kurtosis tests (skewness and kurtosis are between -1 to 1 and -2 to 2 for both variables). However, Kolmogorov-Smirnov and Shapiro-Wilk tests show that none of the variables are classic normally distributed (see Table 8.6). Hence, transformation of data will be considered for majority of the variables in the next step.

Table 8.5

Descriptive statistics for chemical industry – raw data (environmental disclosure)

Variable	**Mean**	**Median**	**Std. Deviation**	**Skewness**	**Kurtosis**
MNGR	0.36	0.33	0.419	1.238	1.256
AGE	8.82	10	5.697	-0.141	-1.475
SIZE$(m)	1.99	1.16	1.952	2.196	5.861
PROF(%)	0.43	0.36	0.057	1.418	6.211
LEV(%)	0.61	0.65	5.384	-6.314	5.348
TOTAL(E)	1.82	1	1.888	2.632	9.458

Note: N = 73

Table 8.6

Test of normality for chemical industry - raw data (environmental disclosure)

	Kolmogorov-Smirnov		**Shapiro-Wilk**	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.404	0.000*	0.680	0.000*
AGE	0.144	0.001*	0.891	0.000*
SIZE	0.246	0.000*	0.738	0.000*
PROF	0.141	0.001*	0.884	0.000*
LEV	0.429	0.000*	0.311	0.000*
TOTAL(E)	0.257	0.000*	0.728	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

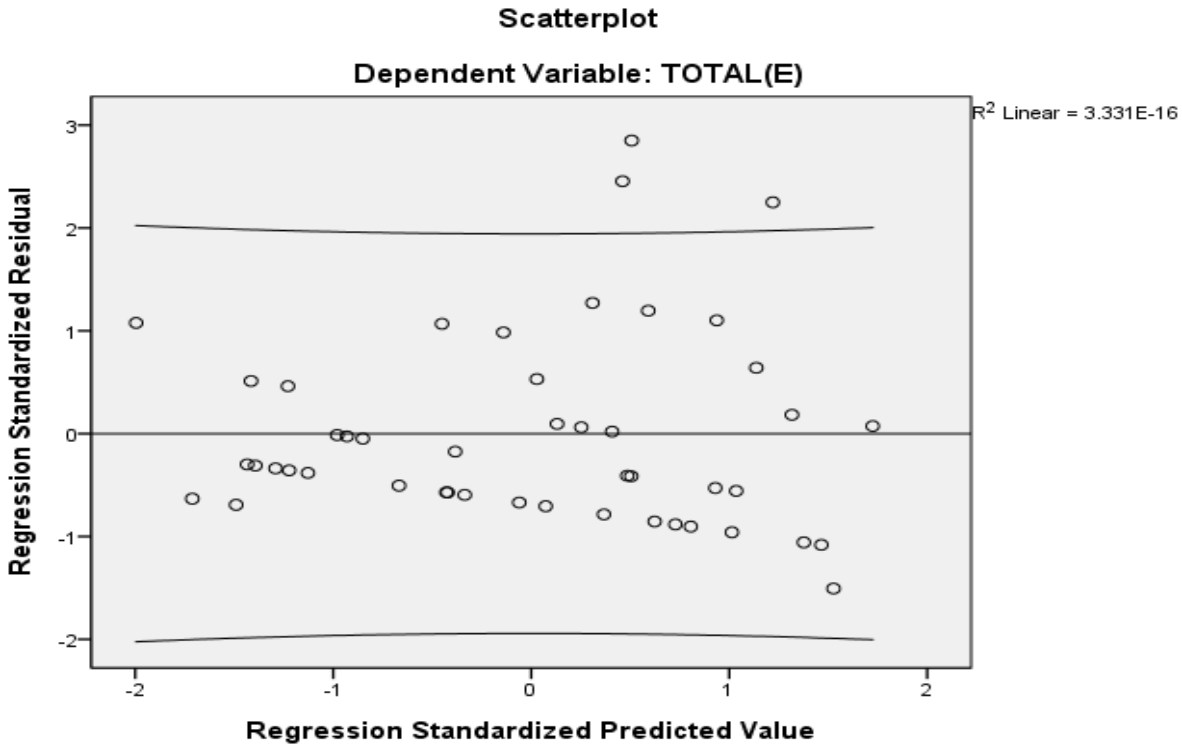
Homoscedasticity, linearity and outliers

A visualisation approach of analysing homoscedasticity, which is an assumption of multivariate analysis, is often considered by many researchers. This includes looking at a particular scatter plot or residual histograms which are indicated as the most informative way. The assumption of multiple regressions is homogenetic, which is also called homoscedasticity in regressions. Therefore, data homoscedasticity between the predicted dependent variable and the independent variables were performed by examining the residuals of scatter plots, which is the standardised regression residual against the standardised regression predicted value.

Figure 8.1 presents the scatterplot for mining industry, and it suggests that homoscedasticity is rejected because a pattern can be hardly seen from figure 8.1. It is apparent that the data is tighter from the left and starts to disperse to the right, which is considered as a typical conventional heteroscedasticity. Therefore, data is required to be transformed.

Figure 8.1

Homoscedasticity for mining industry (environmental disclosure)



The trend of data for mining industry can also be observed in the electricity supply industry (see figure 8.2). The scatterplot indicates the existence of heteroscedasticity, nonetheless, data started to fade away across the horizontal axis. Similarly, scatterplot for chemical industry showed the shape is a funnel, which again, suggests that the variance of error terms was not constant, violating homoscedasticity.

Figure 8.2

Homoscedasticity for electricity supply industry (environmental disclosure)

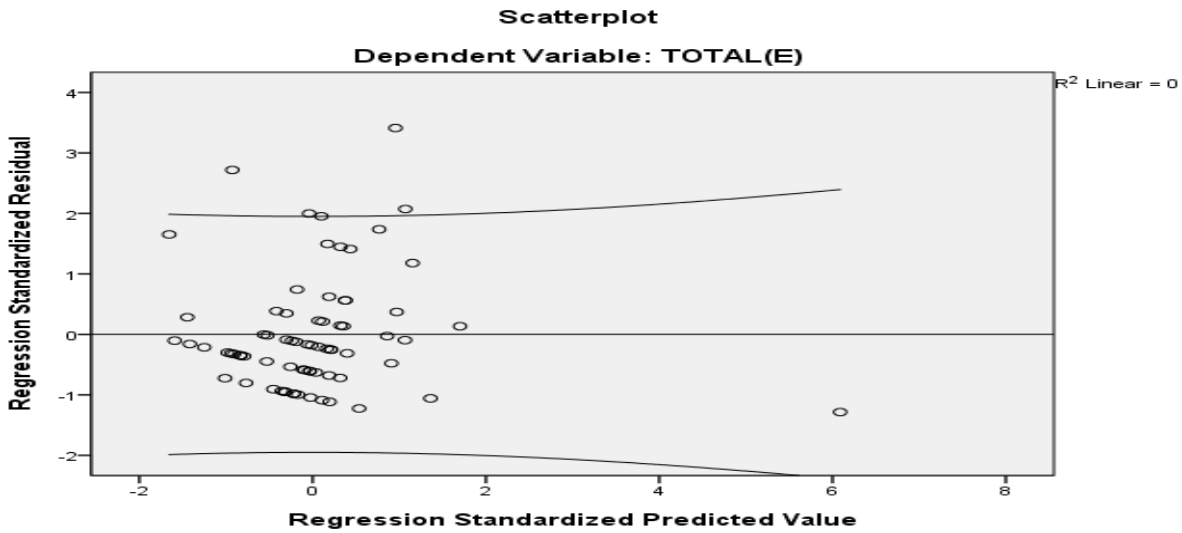
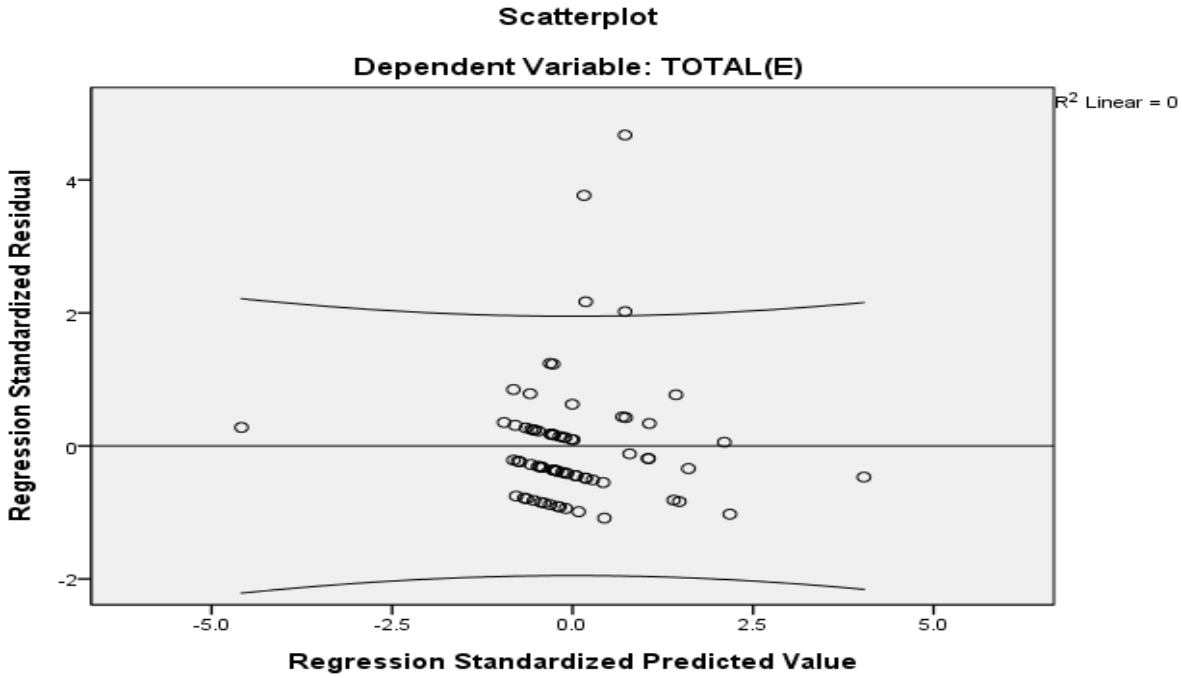


Figure 8.3

Homoscedasticity for chemical industry (environmental disclosure)



Univariate outliers can be presented by visualising normal probability plots and scatter plots of each variable, such as the outlier in figure 8.2 with a regression standardised predicted value of 6, and the two outliers in figure 8.3 with regression standardised residual values of 3.9 and 4.4. As the distribution of both independent and dependent variable were not normal, the assumption of linearity thus was violated. Coding errors and missing data have been checked by an experienced content analysis expert, and no errors were detected. Hence, transformation of data is considered first, rather than deleting outliers to possibly improve data linearity.

Transformation of data

Variables rarely conform to a classic normal distribution, and more often, distributions are skewed and display varying degrees of kurtosis. When skewness and kurtosis are extreme, transformation is an option. Tabachnick and Fidell (2007) suggest that data transformation can be conducted under square root, natural logarithmic or inverse transformation. Transformations were performed for both dependent and independent variables in this study, and table 8.7 presents data for mining industry after transformation.

As the distribution of the observed data for variable PROF (income/total asset), TOTAL(E) (total voluntary environmental disclosures of GRI information) are severely skewed positively, a reciprocal transformation was employed. As SIZE (total asset) is substantially positively skewed, a log transformation was employed. Note that, according to Tabachnick and Fidell (2007), in order to avoid taking the log and inverse of zero, one was added for variables because they contained values less than one. These variables include TOTAL(E), PROF and SIZE. MNGR (number of independent directors), AGE (listed years) and LEV (total liability/total asset) will not be transformed because they are considered as normal.

Table 8.7

Data transformation for mining industry (environmental disclosure)

Variable	**Transformation**
SIZE	**Log: LN(SIZE)**
PROF	**Reciprocal: 1/(1+PROF)**
TOTAL(E)	**Reciprocal: 1/(1+TOTAL(E))**

As it can be seen from table 8.8, both skewness and kurtosis were reduced and the distributions were close to normality. Although the Kolmogorov-Smirnov and Shapiro-Wilk values were still found to fall outside normality (see table 8.9), the mean and median for each of those variables are relatively close together. Therefore it is assumed that all variables after the transformation of data are approaching normality.

Table 8.8

Descriptive statistics (mining industry) – data transformation (environmental disclosure)

Variable	**Mean**	**Median**	**Std. Deviation**	**Skewness**	**Kurtosis**
MNGR	0.37	0.36	0.049	1.132	0.887
AGE	8.26	8	4.465	0.081	-1.229
LnSIZE	22.77	22.83	1.617	0.529	1.275
RecPROF	0.92	0.923	0.066	-1.701	5.867
LEV	0.81	0.733	0.660	1.277	1.741
RecTOTAL(E)	0.38	0.33	0.218	1.231	2.086

Note: N = 47

Table 8.9

Test of normality (mining industry) (environmental disclosure)

	Kolmogorov-Smirnov		**Shapiro-Wilk**	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.231	0.000*	0.859	0.000*
AGE	0.141	0.020*	0.943	0.024*
LnSIZE	0.141	0.020*	0.945	0.028*
RecPROF	0.125	0.062	0.884	0.000*
LEV	0.131	0.042*	0.886	0.000*
RecTOTAL(E)	0.230	0.000*	0.836	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

In respect of the raw data for the electricity supply industry, the data transformation methods are similar to that applied to the mining industry. As SIZE is substantially positive skewed, a nature log function was appropriate for the transformation. PROF and TOTAL(E) were slightly negatively and skewed positively; thus reciprocal transformation was appropriate (see table 8.10).

Table 8.10

Data transformation for electricity supply industry (environmental disclosure)

Variable	**Transformation**
SIZE	**Log: LN(SIZE)**
PROF	**Reciprocal: 1/(1-PROF)**
TOTAL(E)	**Reciprocal: 1/(1+TOTAL(E))**

Tables 8.11 and 8.12 present the descriptive statistics and the test of normality for the transformed data. It can be seen that skewness and kurtosis all can be accepted as normally distributed for all variables. Although Kolmogorov-Smirnov and Shapiro-Wilk Values mostly rejects data from normality, the means and medians are close each other. Hence, data are assumed to be approaching normality.

Table8.11

Descriptive statistics (electricity supply industry) – data transformation (environmental disclosure)

Variable	**Mean**	**Median**	**Std. Deviation**	**Skewness**	**Kurtosis**
MNGR	0.368	0.333	0.091	0.535	5.822
AGE	11.82	13	4.366	-0.791	0.090
LnSIZE	3.09	3.09	0.054	0.348	0.281
RecPROF	1.03	1.03	0.066	0.292	10.264
LEV	1.05	0.71	1.456	-0.404	1.782
RecTOTAL(E)	0.45	0.33	0.290	0.988	-0.184

Note: N = 73

Table 8.12

Test of normality (electricity supply industry) (environmental disclosure)

	Kolmogorov-Smirnov		**Shapiro-Wilk**	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.264	0.000*	0.853	0.000*
AGE	0.157	0.000*	0.929	0.000*
LnSIZE	0.129	0.004*	0.979	0.248
RecPROF	0.159	0.000*	0.819	0.000*
LEV	0.224	0.000*	0.760	0.000*
RecTOTAL(E)	0.247	0.000*	0.820	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Table 8.13 presents transformations for the chemical industry. Company SIZE and TOTAL(E) were transformed under the nature log, and PROF and TOTAL(S) were transformed under a reciprocal function operation.

Table 8.13

Data transformation for chemical industry (environmental disclosure)

Variable	**Transformation**
SIZE	**Log: Ln(SIZE)**
PROF	**Reciprocal: 1/(1+PROF)**
TOTAL(E)	**Log: Ln(TOTAL(E))**
LEV	**Log: Ln(LEV)**

Tables 8.14 and 8.15, show data transformation has brought the skewness and kurtosis to an acceptable level for normality. Although LnSIZE and LnLEV are the only satisfied variables under Kolmogorov-Smirnov and Shapiro-Wilk tests, all variables are shown to be acceptable in terms of the means, median, skewness and kurtosis. Hence, although data was not classic normally distributed, it is accepted that it approaches normality.

Table 8.14

Descriptive statistics (chemical industry) – data transformation (environmental disclosure)

Variable	Mean	Median	Std. Deviation	Skewness	Kurtosis
MNGR	0.356	0.33	0.419	1.238	1.256
AGE	8.82	10.00	5.697	-0.141	-1.475
LnSIZE	21.06	20.87	0.817	0.422	-0.317
RecPROF	0.96	0.97	0.050	-0.541	3.875
LnLEV	-0.58	-0.35	1.298	-0.217	0.385
RecTOTAL(E)	0.48	0.50	0.267	1.022	-0.001

Note: N = 73

Table 8.15

Test of normality (chemical industry) (environmental disclosure)

	Kolmogorov-Smirnov		Shapiro-Wilk	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.404	0.000*	0.680	0.000*
AGE	0.144	0.001*	0.891	0.000*
LnSIZE	0.126	0.006*	0.970	0.076
RecPROF	0.136	0.002*	0.924	0.000*
LnLEV	0.086	0.200	0.989	0.817
RecTOTAL(E)	0.296	0.000*	0.808	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Univariate statistics

Univariate analysis was employed to provide the relationships between the dependent and the independent variables (Coakes et al., 2010). In particular, it focuses on the correlation between the dichotomous variable and continuous variables, as well as the strength of the relationships and the possibility of multicollinearity (Field, 2009).

Test of multicollinearity in a univariate setting

The presence of multicollinearity is considered to be problematic when analysing multivariate regressions. In this setting, a correlation matrix was employed to indicate the existence of multicollinearity. Coakes et al. (2010) suggest that multicollinearity is identified if any of the squared multiple correlations are near or equal to 1. Field (2009) further explains that if correlations are above 0.8 or 0.9, multicollinearity exists. Nonetheless, the inclusion of the offending variables needs to be reconsidered. Tables 8.16, 8.17 and 8.18 present the correlations between the independent variables for mining, electricity supply, and chemical industries respectively. As shown in the table, all variables obtain correlations less than 0.8; therefore they do not include any harmful multicollinearity in the regression models.

Table 8.16

Test of multicollinearity (mining industry) – Univariate (environmental disclosure)

		GOWN	MNGR	MIA	AGE	RecPROF	LnSIZE	LEV
GOWN	Pearson Correlation	1						
	Sig. (1-tailed)							
MNGR	Pearson Correlation	.026	1					
	Sig. (1-tailed)	.329						
MIA	Pearson Correlation	-.053	-.125	1				
	Sig. (1-tailed)	.361	.205					
AGE	Pearson Correlation	-.097	.215	.245*	1			
	Sig. (1-tailed)	.004	.002	.000				
RecPROF	Pearson Correlation	.192	-.022	-.290*	-.045	1		
	Sig. (1-tailed)	.000	.013	.027	.006			
LnSIZE	Pearson Correlation	.394**	.072	.233	-.204*	-.218	1	
	Sig. (1-tailed)	.000	.001	.062	.001	.080		
LEV	Pearson Correlation	.064*	-.155	.211	.106	.394*	.046	1
	Sig. (1-tailed)	.041	.003	.044	.006	.005	.035	

Table 8.17

Test of multicollinearity (electricity supply industry) – Univariate (environmental disclosure)

		GOWN	MIA	AGE	LnSIZE	RecPROF	LEV	MNGR
GOWN	Pearson Correlation	1						
	Sig. (1-tailed)							
MIA	Pearson Correlation	.098	1					
	Sig. (1-tailed)	.204						
AGE	Pearson Correlation	-.144	.122	1				
	Sig. (1-tailed)	.002	.013					
LnSIZE	Pearson Correlation	.345**	.348	.279	1			
	Sig. (1-tailed)	.001	.002	.013				
RecPROF	Pearson Correlation	-.301	-.049	-.011	.068	1		
	Sig. (1-tailed)	.009	.042	.006	.003			
LEV	Pearson Correlation	.378**	.071	-.117	-.036*	-.187*	1	
	Sig. (1-tailed)	.003	.086	.052	.039	.019		
MNGR	Pearson Correlation	-.076	-0.130	.089	-.131	.010	-.081	1
	Sig. (1-tailed)	0.034	0.006	0.015	0.021	0.380	0.006	

Table 8.18

Test of multicollinearity (chemical industry) – Univariate (environmental disclosure)

		GOWN	MNGR	MIA	AGE	LnSIZE	RecPROF	LnLEV
GOWN	Pearson Correlation	1						
	Sig. (1-tailed)							
MNGR	Pearson Correlation	-.004	1					
	Sig. (1-tailed)	.001						
MIA	Pearson Correlation	.047	-.282	1				
	Sig. (1-tailed)	.347	.009					
AGE	Pearson Correlation	.130	-.055	-.118	1			
	Sig. (1-tailed)	.000	.004	.000				
LnSIZE	Pearson Correlation	.104	-.007	-.014	.331**	1		
	Sig. (1-tailed)	.001	.016	.000	.002			
RecPROF	Pearson Correlation	.196	.056	-.229	.541**	.142	1	
	Sig. (1-tailed)	.003	.046	.000	.000	.122		
LnLEV	Pearson Correlation	.244*	.028	-.159	.528**	.337**	.526**	1
	Sig. (1-tailed)	.022	.000	.040	.000	.002	.000	

Univariate analysis

In this section, Pearson correlation was employed to determine the relationship between each of the dependent and independent variables, including GOWN (government ownership), AGE (company listing years), MIA (membership of industrial association), PROF (profitability), LEV (leverage), SIZE (company size) and TOTAL(E) (total environmental disclosures of GRI information). The results from the Pearson correlation analysis are presented in tables 8.19, 8.20 and 8.21 for mining, electricity supply and chemical industries respectively.

Cohen (1988) indicates that the absolute value of r is the determinants for Pearson correlation in univariate analysis. Weak correlations exist when the absolute value of r falls between 0.1 and 0.299; moderate correlations exist when the absolute value of r falls between 0.3 and 0.499; strong correlations exist when the absolute value of r falls from 0.5 to 1. As can be seen from table 8.19, MNGR (independent director ratio) (r = -0.356), MIA (member of industrial association) (r = -0.368), AGE (company age) (r = -0.323), SIZE (companies size) (r = -0.463) and LEV (leverage) (r = -0.397) are moderately significant towards the dependent variable RecTOTAL(E); PROF (profitability) (r = -0.510) is the only variable that is strongly correlated with RecTOTAL(E).

The correlations of variables are statistically significant when the significance is at 0.01 level, and it is moderate significant when it is at 0.05 level. The results from Pearson correlation indicate that MNGR, MIA and AGE are moderate significant, whereas RecPROF, Lnsize and LEV are significant. GOWN (government ownership) was found insignificant in this analysis.

Table 8.19

Results from Pearson correlation (mining industry) (environmental disclosure)

		Expected sign	RecTOTAL(E)
GOWN	Pearson Correlation	-	-0.104
	Sig. (1-tailed)		0.234
MNGR	Pearson Correlation	-	-0.356
	Sig. (1-tailed)		0.011*
MIA	Pearson Correlation	-	-0.368
	Sig. (1-tailed)		0.030*
AGE	Pearson Correlation	-	-0.323
	Sig. (1-tailed)		0.049*
RecPROF	Pearson Correlation	+	-0.510
	Sig. (1-tailed)		0.000**
LnSIZE	Pearson Correlation	-	-0.463
	Sig. (1-tailed)		0.001**
LEV	Pearson Correlation	-	-0.397
	Sig. (1-tailed)		0.010**

*Note: *p < 0.05; **p < 0.01*

Since the dependent variable TOTAL(E), which is the total environmental disclosures under GRI, was inversed during data transformation, the relationship between the original dependent variable was expected to have opposite sign as previously discussed.

Table 8.20 presents the results of electricity supply industry from Pearson correlation analysis. The majority of the independent variables were shown to be moderate significantly correlated with the RecTOTAL(E), such as MNGR (r = -0.279), AGE (r = -0.270), RecPROF (r = 0.314), LnSIZE (r = -0.375) and LEV (r = -0.487). MIA (r = -0.568) was found to be significantly correlated with the dependent variable.

It was found in the analysis that MIA, AGE, RecPROF and LnSIZE were statistically significant at 0.01 level, and MNGR was moderate significant at 0.05 level. Similarly, GOWN was found to be insignificant in electricity supply industry.

Table 8.20

Results from Pearson correlation (electricity supply industry) (environmental disclosure)

		Expected sign	RecTOTAL(E)
GOWN	Pearson Correlation	-	-0.183
	Sig. (1-tailed)		0.060
MNGR	Pearson Correlation	-	-0.279
	Sig. (1-tailed)		0.033*
MIA	Pearson Correlation	-	-0.568
	Sig. (1-tailed)		0.000**
AGE	Pearson Correlation	-	-0.270
	Sig. (1-tailed)		0.005**
RecPROF	Pearson Correlation	+	0.314
	Sig. (1-tailed)		0.000**
LnSIZE	Pearson Correlation	-	-0.375
	Sig. (1-tailed)		0.004**
LEV	Pearson Correlation	-	-0.487
	Sig. (1-tailed)		0.001**

*Note: *p < 0.05; **p < 0.01*

Similar to the previous analysis, the dependent variable TOTAL(E), which is the total environmental disclosures under GRI, was inversed during data transformation, relationship between dependent variable, was expected to have opposite sign. Since variable PROF was inversed during data transformation also, the relationship between independent variable RecPROF and TOTAL(E) was still expected to be positive.

Results from Pearson correlation of chemical industry show that RecPROF (r = -0.584) was the only independent variable that is significantly correlated with RecTOTAL(E). MNGR (r = -0.326), MIA (r = -0.320), AGE (r = -0.418), LnSIZE (r = 0.244) and LnLEV (r = -0.30) were found to be moderate significantly correlated with RecTOTAL(E). MNGR, MIA, AGE, RecPROF and LEV were found to be statistically significant at 0.01 level, and LnSIZE was found to be moderate significant. It was found in chemical industry that GOWN was not significant.

Table 8.21

Results from Pearson correlation (chemical industry) (environmental disclosure)

		Expected Sign	RecTOTAL(E)
GOWN	Pearson Correlation	-	0.031
	Sig. (1-tailed)		0.398
MNGR	Pearson Correlation	-	-0.326
	Sig. (1-tailed)		0.009**
MIA	Pearson Correlation	-	-0.320
	Sig. (1-tailed)		0.008**
AGE	Pearson Correlation	-	-0.418
	Sig. (1-tailed)		0.001**
RecPROF	Pearson Correlation	+	0.584
	Sig. (1-tailed)		0.000**
LnSIZE	Pearson Correlation	-	-0.24
	Sig. (1-tailed)		0.016*
LnLEV	Pearson Correlation	-	-0.30
	Sig. (1-tailed)		0.007**

*Note: *p < 0.05; **p < 0.01*

Multivariate statistics

Multiple regressions analysis is used when independent variables are correlated with one another and with the dependent variables (Coakes et al., 2010). Therefore, multivariate statistics was conducted to test the seven directional hypotheses variables.

Testing of multicollinearity in a multivariate setting

A number of assumptions underpin the use of regressions: ratio of cases to independent variables, outliers, multicollinearity and singularity, normality, linearity, homoscedasticity and independence of residual (Coakes et al., 2010). Ratio of cases to independent variables means that a sample size is only acceptable when it is at least 5 times more than independent variables. In this study, the sample size is larger than what it is required. Apart from multicollinearity, the other assumptions have been previously discussed; therefore they will not be specifically introduced again this section.

Multicollinearity refers to high correlations among the independent variables existing. These problems affect the interpretation of relationships between the predictors and the

dependent TOTAL(E) variable. To maintain the quality of the multiple regressions, a test of multicollinearity will be considered to detect the magnitude of the variance inflation factor (VIF). Coakes et al. (2010) indicates that the regression model may be biased by multicollinearity when VIF is greater than 10. Another indicator for multicollinearity is tolerance. Yuan (2007) suggests that high collinearity exists when the tolerance coefficient is less than 0.2 and close to zero. Tables 8.22, 8.23 and 8.24 present the results of the tests of multicollinearity for mining, electricity supply, and chemical companies. The tables show that the T values and VIF ranged in an acceptable level, and no harmful indicators can be obtained from the results.

Table 8.22

Test of multicollinearity (mining) – multivariate (environmental disclosure)

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
GOWN	0.732	1.366
MIA	0.714	1.400
AGE	0.564	1.774
LnSIZE	0.681	1.468
RecPROF	0.559	1.788
LEV	0.574	1.732
MNGR	0.577	1.400

Table 8.23

Test of multicollinearity (electricity supply) – multivariate (environmental disclosure)

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
GOWN	0.702	1.424
MIA	0.803	1.246
AGE	0.815	1.228
LnSIZE	0.711	1.406
RecPROF	0.853	1.172
LEV	0.794	1.259
MNGR	0.942	1.061

Table 8.24

Test of multicollinearity (chemical) – multivariate (environmental disclosure)

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
GOWN	0.931	1.074
MIA	0.949	1.050
AGE	0.645	1.053
LnSIZE	0.803	1.551
RecPROF	0.806	1.246
LnLEV	0.592	1.240
MNGR	0.953	1.689

In this study, both tolerance and VIF are considered as acceptable for undertaking the regression model. The results indicate that all variables were not materially affected by multicollinearity.

Multiple regressions

This subsection presents the results from the ordinary least squares multiple regressions analysis. The result from each sample industry is discussed separately.

The dependent variable TOTAL(E) was inversed during data transformation, which means that the relationship between independent variables GOWN, MIA, AGE, LnSIZE, LEV and MNGR were expected to be negative. Since the direction of variable PROF was inverted in data transformation, the relationship between RecPROF and dependent variable TOTAL(E) was still expected to be positive.

The results from multiple regressions for the mining industry showed the model to be statistically significant (R^2 = 0.364, F = 31.373, P = 0.000). This indicates that the relationships between the dependent variable (TOTAL(E), the total number of environmental disclosures in mining industry) and the independent variables MIA (member of industrial associations) (t = -4.592, p < 0.01) and RecPROF (profitability) (t = 5.175, p < 0.1) are statistically significant at the 0.01 level. Variables AGE (company listing years) (t = -1.277, p < 0.05) and SIZE (company size) (t = -2.044, p < 0.05) are moderately significant at 0.05 level. Variable MNGR (number of independent directors/total number of directors) is approaching significance at 0.1 level. Variable GOWN (government ownership) and LEV (leverage) are not found to be significant in

the multiple regressions; however, LEV was found to be statistically significant in univariate analysis. Interestingly, all variables in the mining industry were found in the expected direction in both univariate and multivariate analysis.

Table 8.25

Results of multiple regressions (mining industry) (environmental disclosure)

Model	**R^2**	**F**	**Sig. (1-tailed)**
Regression	0.364	31.373	0.000*

Note: Predictors: (Constant), MIA, RecPROF; *p < 0.05

Table 8.25

Results of multiple regressions (mining industry) (environmental disclosure) (Cont'd)

Variable	**Hypothesis**	**Expected sign**	**B**	**Beta**	**T**	**Sig. (1-tailed)**
GOWN	H1	-	-	-0.110	-0.817	0.365
MIA	H3	-	-0.331	-0.305	-4.592	0.000***
AGE	H6	-	-0.297	-0.156	-1.277	0.045**
LnSIZE	H7	-	-0.451	-0.461	-2.044	0.014**
RecPROF	H4	+	0.439	0.421	5.175	0.000***
LEV	H5	-	-	-0.129	-0.908	0.169
MNGR	H2	-	-	-0.128	-1.040	0.057*

Note: N = 47; *p < 0.1; **p < 0.05; ***p < 0.01

Table 8.26 demonstrates the results from multivariate analysis for electricity supply industry. Overall the results were found to be statistically significant (R^2 = 0.322; F = 33.671; P = 0.001). Since the dependent variable TOTAL(E) was inverted during data transformation, relationship between independent variables GOWN, MIA, AGE, LnSIZE, LEV and MNGR were expected to be negative. However, the direction of distribution of variable PROF was reversed during data transformation, but the relationship between the independent variable and dependent variables TOTAL(E) was still expected to be positive.

The results show that the dependent variable TOTAL(E) is significantly correlated with the independent variables MIA (t = -4.590, p < 0.01), AGE (t = -3.382, p < 0.01) and LEV (t = -5.298, p < 0.01) at 0.01 level. Variable SIZE (t = -1.462) is significant at 0.05 level and variables MNGR and PROF are approaching significant at 0.1 level. GOWN

is not found to be significant in the analysis; however, all independent variables in electricity supply were shown to have the expected signs of direction.

Table 8.26

Results of multiple regressions (electricity supply industry) (environmental disclosure)

Model	**R^2**	**F**	**Sig. (1-tailed)**
Regression	0.322	33.671	0.001*

Note: Predictors: (Constant), MIA, AGE, LEV; *p < 0.05

Table 8.26

Results of multiple regressions (electricity supply industry) (environmental disclosure) (environmental disclosure) (Cont'd)

Variable	**Hypothesis**	**Expected sign**	**B**	**Beta**	**T**	**Sig. (1-tailed)**
GOWN	H1	-	-	-0.124	-0.497	0.245
MIA	H3	-	-0.295	-0.490	-4.590	0.000***
AGE	H6	-	-0.362	-0.141	-3.328	0.001***
LnSIZE	H7	-	-0.78	-0.270	-1.426	0.043**
RecPROF	H4	+	+	0.157	1.035	0.061*
LEV	H5	-	-0.424	-0.450	-5.298	0.000***
MNGR	H2	-	-	-0.159	-1.012	0.077*

Note: N = 73; *p < 0.1; **p < 0.05; ***p < 0.01

Since dependent variable TOTAL(E) was inverted during data transformation, relationship between independent variables GOWN, MIA, AGE, LnSIZE, LnLEV and MNGR were expected to be negative. The direction of distribution of variable PROF was reversed during data transformation, but the relationship between independent and dependent variables TOTAL(E) was still expected to be positive.

Table 8.27 shows the regressions results from the chemical industry data, which indicates that R^2 of 0.327 is statistically significant (F = 31.470; P = 0.000). Three variables MIA (t = -5.312, p < 0.01) and RecPROF (t = 5.384, p < 0.01) were found to be significant at 0.01 level. LnSIZE (t = -2.021, p < 0.05) and AGE (t = 1.148, p < 0.05) were shown to be moderate significant at 0.05 level. LnLEV was found to be approaching significant at 0.1 level. The remaining two variable GOWN and MNGR were not found to be significant but all in the expected direction.

Table 8.27

Results of multiple regressions (chemical industry) (environmental disclosure)

Model	**R^2**	**F**	**Sig. (1-tailed)**
Regression	0.327	31.470	0.000*

Note: Predictors: (Constant), MIA, RecPROF; *p < 0.05

Table 8.27

Results of multiple regressions (chemical industry) (environmental disclosure) (Cont'd)

Variable	**Hypothesis**	**Expected sign**	**B**	**Beta**	**T**	**Sig. (1-tailed)**
GOWN	H1	-	-	-0.058	-0.305	0.459
MIA	H3	-	-0.410	-0.420	-5.132	0.000***
AGE	H6	-	-0.398	-0.139	-1.148	0.044*
LnSIZE	H7	-	-0.312	-0.255	-2.021	0.026**
RecPROF	H4	+	0.477	0.171	5.384	0.000***
LnLEV	H5	-	-0.361	-0.176	-1.086	0.091*
MNGR	H2	-	-	-0.125	-0.290	0.308

Note: N = 73; *p < 0.1; **p < 0.05; ***p < 0.01

Discussion of results

The results from this study indicate that certain variables from legitimacy theory are able to explain the extent of voluntary environmental disclosures in Chinese mining, electricity supply and chemical companies' annual reports, whilst other variables are less able to. In terms of the results for environmental disclosures, this study shows the applicability and predictive power of legitimacy theory by having more than half of the predicting variables being statistically significant. First, companies that are more profitable (in terms of ROA), disclose significantly more than the others that are less profitable. Although this hypothesis shows a moderate significance in electricity companies, it is still statistically significant. This corresponds with legitimacy theory that older, larger and profitable companies face more media exposure which can threaten their survivals. In the circumstance, they obtain social acceptance or reputation for being the societal citizen through environmental disclosures. It indicates that while these companies are able to remain profitable, they are also capable of implementing corporate environmental responsibility. Moreover, companies that have become a

member of industrial associations established by the government disclose significantly more environmental information in their annual reports than the other ones across the three sample industries. Due to the natural environmental sensitive business activities, Chinese industrial associations have set policies for companies to implement environmental responsibilities in accordance with the national sustainability plans. Companies that do not disclose the required amount of information are more likely to experience legitimacy loss through industrial media exposure. As explained by legitimacy theory, a considerable impact to companies' social contract can influence their survival significantly (O'Donovan, 2002); therefore companies are willing to disclose more information. In addition, the results show that these associations have played extraordinarily well in terms of supervising and monitoring. According to the 10^{th} five year plan, the Chinese government announced to reduce pollution emissions by 10% but it did not meet the target by the end. The objective to reduce emissions by another 10% has been set in the 11^{th} five year plan (valid from 2006 to 2010), and 14.29% for the 12^{th} five year plan. These plans have been incorporated by the industrial associations in order to improving the current status of corporate environmental performance in China. However, plans are not mandatory regulations and rules, and having the plans cannot increase the overall environmental disclosure after all.

By looking at the results from mining industry, multivariate analysis shows that membership of industrial association and profitability are highly correlated and therefore are able to explain the extent of environmental reporting. Hypotheses three and four are accepted. Company listing age and company size were found to be moderately significant, whereas government ownership, leverage and the ratio of independent directors were found to be insignificant.

In Chinese electricity supply industry, the extent of environmental disclosures can be determined by variables member of industrial association, company listing age and leverage ratio according to the multivariate results. Therefore, hypotheses three, five and seven are accepted, the other four variables, government ownership, company size, profitability and management role are less significant. Company size is found to be moderately significant, whereas leverage ratio and the number of independent directors were less significant, approaching moderate significance level. Government ownership is found not to be significant.

For chemical industry, hypotheses three and four are accepted and the remaining five hypotheses, government ownership, company age, company size, leverage and

management role are rejected. Company listing age and company size were found to be moderate significant. Leverage ratio is less moderate significant, whereas government ownership and number of independent directors are not significant.

Comparison of results

In order to examine to what extent environmental disclosures differ across industries, standardised beta from the results of multivariate analysis was compared. As most of the variables (AGE, Size, PROF and MNGR) have been used the same methods for data transformation in all three industries, the transformed data was used for comparison. However, the natural logarithm for leverage ratio was used for chemical industry whereas the other two industries were not transformed; hence, it was converted back from Ln(LEV) to leverage (LEV). The result of LEV for chemical industry was not shown to be statistically significant (beta = 0.122, T = 1.096, P = 0.409).

Table 8.28

Comparison of standardised Beta across industries (environmental disclosure)

Variable		**Mining Industry**	**Electricity Supply Industry**	**Chemical Industry**
GOWN	Beta	-0.110	-0.124	-0.058
	Sig.	0.365	0.245	0.459
MIA	Beta	-0.305	-0.490	-0.420
	Sig.	0.000**	0.000**	0.000**
AGE	Beta	-0.156	-0.141	-0.139
	Sig.	0.045*	0.001**	0.044*
LnSIZE	Beta	-0.461	-0.270	-0.255
	Sig.	0.014*	0.043*	0.0261*
RecPROF	Beta	0.421	0.157	0.171
	Sig.	0.000**	0.061	0.000**
LEV	Beta	-0.129	-0.450	0.122
	Sig.	0.169	0.000**	0.409
MNGR	Beta	-0.128	-0.159	0.125
	Sig.	0.057	0.077	0.308

Note: **p<0.01; *p<0.05

Table 8.28 presents the standardised beta comparison across industries. Interestingly, member of industrial association, company listing age and company size were found to be statistically significant among all industries. The independent variable, member of industrial association, influences electricity supply industry the most with beta of 0.490, following by chemical industry and mining industry with beta of 0.420 and 0.305 respectively. Company listing age and company size were also found to be significant, influencing the mining industry the most with betas of 0.156 and 0.461, followed by electricity supply industry and chemical industry with betas 0.141, 0.270 and 0.139, 0.255. Company profitability was found to be a key determinant in both mining and chemical industries, and it correlates mining industry with beta of 0.421, whereas the beta for chemical industry is 0.171. Although it does not show a significant p value for electricity supply industry, the significance level approaches the moderate level. Moreover, leverage ratio is only found to be significant in electricity supply industry, and the remaining variables (i.e. government ownership and management role) did not show any significant results. In summary, there is not much difference that the independent variables influence across industries.

It is interesting that government ownership and the independent director ratio were not shown to be significant in any of the sample industries; however, the overall results show that the three industries share a lot in common and they do have the same trend in predicting the extent of environmental disclosures by using the same independent variables. This indicates that it might be possible to have the three industries included in one single model instead of three different models.

Summary

This chapter has presented, discussed and compared the results of the tests developed to investigate the hypotheses formulated for environmental disclosures based on legitimacy theory framework. The results indicate that most of the hypothesised variables are able to explain the extent of environmental disclosures in annual reports, and they influence approximately to a similar extent across industries. The next chapter will focus on data analysis regarding social disclosure.

CHAPTER 9

REGRESSION RESULTS ANALYSIS IN SOCIAL DISCLOSURE

Introduction

The social dimension of sustainability concerns the impacts an organisation has on the social system within which it operates (GRI, 2010). This chapter discusses and presents the outcome of the statistical analysis of the hypotheses formulated in Chapter 4 and the research methodology described in Chapter 5, concerning social disclosure in mining, electricity supply and chemical industries. The associations between the hypothesised explanatory variables and the extent of social disclosure are interpreted.

Descriptive statistics

As presented in the previous chapter, descriptive statistics were firstly employed to test the assumptions of normality. There were indicators collected in descriptive statistics, such as mean, median, standard deviation, skewness and kurtosis.

Descriptive statistics for mining industry

Table 9.1 presents the distributions for the dependent and independent variables for the mining industry. Since the independent variable for testing social disclosure is the same as environmental disclosure, the results from descriptive statistics were similar to the previous chapter. Company size (total asset), profitability (net income/total asset) and leverage (total liability/total asset) were determined employing mean, median, standard deviation, skewness and kurtosis, and their explanations in descriptive statistics were already given in the previous chapter. The dependent variable for social dimension was TOTAL(S), which is total number of social disclosure under the GRI. From a graphical approach in terms of normality, the means for TOTAL(S), approaching the median, and datasets can be seen as close to normal distribution. Skewness and kurtosis show that the distribution of TOTAL(S) was too peaked. Table 9.2 demonstrates further indications about results of the non-graphic tests, Kolmogorov-Smirnov and Shapiro-Wilk show that TOTAL(S) departs from normality as the p-values (significance) go below 0.05. Coakes et al. (2010) indicate that variables can be considered as normally

distributed when skewness and Kolmogorov-Smirnov approaches -1 to 1 or 0.05. However, both graphic and non-graphic tests confirmed that TOTAL(S) departs from normality.

Table 9.1

Descriptive statistics for mining industry – raw data (social disclosure)

Variable	**Mean**	**Median**	**Std. Deviation**	**Skewness**	**Kurtosis**
MNGR	0.37	0.36	0.049	1.132	0.887
AGE	8.26	8	4.651	0.081	-1.229
SIZE$(m)	4.67	8.20	1.988	6.509	43.51
PROF(%)	0.10	0.08	0.095	2.896	12.72
LEV(%)	0.81	0.73	0.660	1.277	1.741
TOTAL(S)	5.49	5	1.921	2.967	12.476

Note: N = 47

Table 9.2

Test of normality for mining industry - raw data (social disclosure)

	Kolmogorov-Smirnov		**Shapiro-Wilk**	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.231	0.000*	0.859	0.000*
AGE	0.141	0.020*	0.943	0.024*
SIZE	0.424	0.000*	0.214	0.000*
PROF	0.173	0.001*	0.757	0.000*
LEV	0.131	0.042*	0.886	0.000*
TOTAL(S)	0.239	0.000*	0.692	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Descriptive statistics for electricity supply industry

Since the sample companies, the independent variables for electricity supply industry in social dimension were identical as the environmental dimension, expatiations for the independent variables were not given in this section. The dependent variable, TOTAL(S), departs from normality (see table 9.3). This can be seen from the skewness (2.153) and kurtosis (5.182), which were too peaked. This can also be indicated from the Kolmogorov-Smirnov and Shapiro-Wilk tests having the p value less than 0.05 (see Table 9.4). The result for TOTAL(S) in a descriptive statistics analysis shows that the

distribution of TOTAL(S) was too peaked, and it confirms that it is not normally distributed.

Table 9.3

Descriptive statistics for electricity supply industry – raw data (social disclosure)

Variable	Mean	Median	Std. Deviation	Skewness	Kurtosis
MNGR	0.37	0.33	0.091	0.535	5.822
AGE	11.82	13	4.366	-0.791	0.090
SIZE$(m)	9.74	3.78	2.002	6.043	42.805
PROF(%)	0.03	0.03	0.619	-1.930	14.050
LEV(%)	1.05	0.71	1.456	-0.404	9.782
TOTAL(S)	5.55	5	2.028	2.153	5.182

Note: N = 73

Table 9.4

Test of normality for electricity supply industry - raw data (social disclosure)

	Kolmogorov-Smirnov		Shapiro-Wilk	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.264	0.000*	0.853	0.000*
AGE	0.157	0.000*	0.929	0.000*
SIZE	0.329	0.000*	0.386	0.000*
PROF	0.181	0.001*	0.774	0.000*
LEV	0.224	0.000*	0.760	0.000*
TOTAL(S)	0.250	0.000*	0.731	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Descriptive statistics for chemical industry

The result for chemical industry in terms of the dependent variable, TOTAL(S), was shown to be fine (see table 9.5). From a graphic approach, the mean value, 4.96, approaches the median. Moreover, the skewness of 1.154 and kurtosis of 1.359 were satisfied as normally distributed. Although TOTAL(S) departs from normality in Kolmogorov-Smirnov and Shapiro-Wilk tests (see table 9.6), it was shown to have normal distribution from graphic and non-graphic approaches.

Table 9.5

Descriptive statistics for chemical industry – raw data (social disclosure)

Variable	Mean	Median	Std. Deviation	Skewness	Kurtosis
MNGR	0.36	0.33	0.419	1.238	1.256
AGE	8.82	10	5.697	-0.141	-1.475
SIZE$(m)	1.99	1.16	1.952	2.196	5.861
PROF(%)	0.43	0.36	0.057	1.418	6.211
LEV(%)	0.61	0.65	5.384	-6.314	52.348
TOTAL(S)	4.96	5	1.086	1.154	1.359

Note: N = 73

Table 9.6

Test of normality for chemical industry - raw data (social disclosure)

	Kolmogorov-Smirnov		Shapiro-Wilk	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.404	0.000*	0.680	0.000*
AGE	0.144	0.001*	0.891	0.000*
SIZE	0.246	0.000*	0.738	0.000*
PROF	0.141	0.001*	0.884	0.000*
LEV	0.429	0.000*	0.311	0.000*
TOTAL(S)	0.250	0.000*	0.808	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

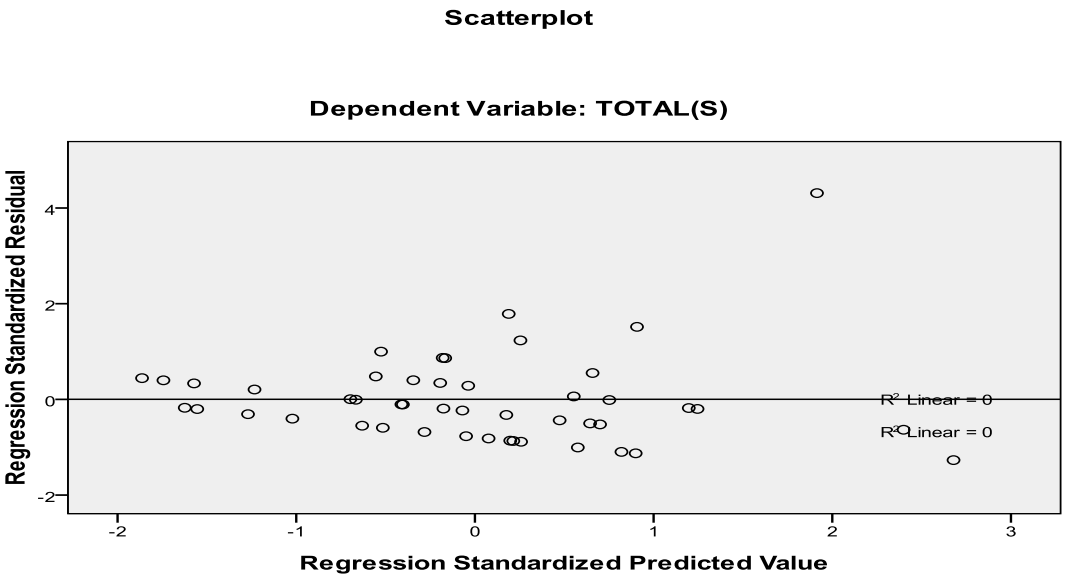
Homoscedasticity, linearity and outliers

Since the independent variables remain unchanged, the process for testing homoscedasticity, linearity and outliers is identical as the previous chapter.

The result from the scatterplot indicates that homoscedasticity is rejected, because the data is tighter at the left and starts to disperse to as the movement is made the right (see figure 9.1). This is considered as a typical and conventional heteroscedasticity. Therefore, data are needed to be transformed.

Figure 9.1

Homoscedasticity for mining industry (social disclosure)



The trend of data for the mining industry can also be observed in the electricity supply and chemical industries (see figure 9.2). The scatterplot indicates the existence of heteroscedasticity, nonetheless, data started to fade away across the horizontal axis. This may suggest that the variance of error terms was not constant, violating homoscedasticity.

Figure 9.2

Homoscedasticity for electricity supply industry (social disclosure)

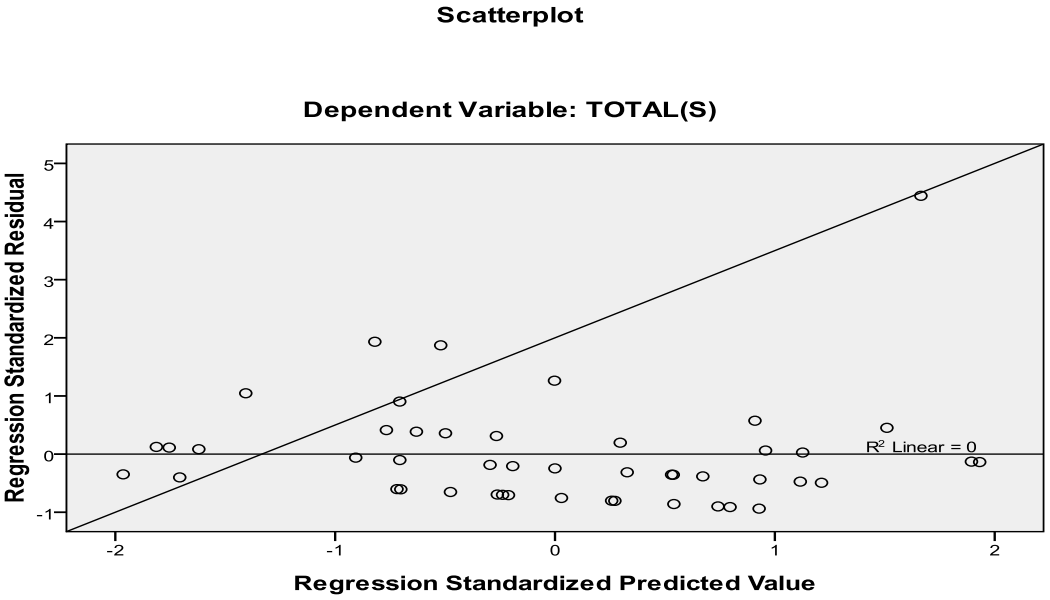
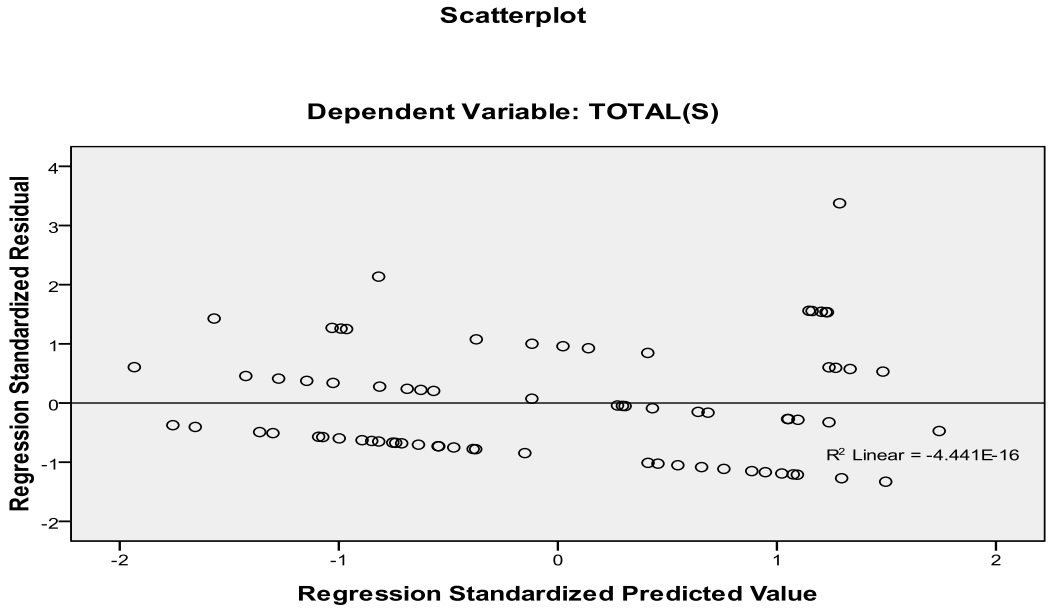


Figure 9.3

Homoscedasticity for chemical industry (social disclosure)



Univariate outliers can be presented by visualising normal probability plots and scatter plots of each variable. It is shown that there could be one potential outlier in figure 9.1, and one in figure 9.2. There were two potential outliers considered in figure 9.3. The author has rechecked the collected data and found no error. In addition, as the distribution of both independent and dependent variable were not normal, the assumption of linearity thus was violated. Coding errors for dependent variable and missing data have been checked by an experienced content analysis expert, and no errors were detected. Hence, transformation of data is considered first, rather than deleting outliers, in order to improve data linearity.

Transformation of data

Variables rarely conform to a classic normal distribution, and more often, distributions are skewed and display varying degrees of kurtosis. When skewness and kurtosis are extreme, transformation is an option. Transformations were performed for both dependent and independent variables in this study, and table 9.7 presents data for mining industry after transformation.

As the distribution of the observed data for variable PROF (income/total asset)and TOTAL(S) (total voluntary social disclosure of GRI information) are severely skewed positive, a reciprocal transformation was employed. As SIZE (total asset) is

substantially positively skewed, a log transformation was employed. Note that, according to Tabachnick and Fidell (2007), in order to avoid taking the log and inverse of zero, one was added for variables because they contained values less than one. These variables include TOTAL(S), PROF and Size. MNGR (number of independent directors), AGE (listed years) and LEV (total liability/total asset) will not be transformed because they are considered as normal.

Table 9.7

Data transformation for mining industry (social disclosure)

Variable	**Transformation**
SIZE	**Log: LN(SIZE)**
PROF	**Reciprocal: 1/(1+PROF)**
TOTAL(S)	**Reciprocal: 1/(1+TOTAL(S))**

As can be seen from table 9.8, both skewness and kurtosis were reduced and the distributions were close to normality. Although the Kolmogorov-Smirnov and Shapiro-Wilk values were still found to fall outside normality, the mean and median for each of those variables are relatively close together (see table 9.9). Therefore, it is assumed that all variables after the transformation of data are approaching normality.

Table 9.8

Descriptive statistics (mining industry) – data transformation (social disclosure)

Variable	**Mean**	**Median**	**Std. Deviation**	**Skewness**	**Kurtosis**
MNGR	0.37	0.36	0.049	1.132	0.887
AGE	8.26	8	4.465	0.081	-1.229
LnSIZE	22.77	22.83	1.617	0.529	1.275
RecPROF	0.92	0.92	0.066	-1.701	5.867
LEV	0.81	0.73	0.660	1.277	1.741
RecTOTAL(S)	0.16	0.17	0.033	-0.729	0.407

Note: N = 47

Table 9.9

Test of normality (mining industry) (social disclosure)

	Kolmogorov-Smirnov		**Shapiro-Wilk**	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.231	0.000*	0.859	0.000*
AGE	0.141	0.020*	0.943	0.024*
LnSIZE	0.141	0.020*	0.945	0.028*
RecPROF	0.125	0.062	0.884	0.000*
LEV	0.131	0.042*	0.886	0.000*
RecTOTAL(S)	0.186	0.000*	0.881	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

In respect of the raw data for electricity supply industry, the data transformation methods are similar to it was applied to the mining industry. As SIZE is substantially positive skewed, a nature log function was appropriate for the transformation. PROF and TOTAL(S) were slightly negatively and positively skewed, hence, reciprocal transformation was appropriate (see table 9.10).

Table 9.10

Data transformation for electricity supply industry (social disclosure)

Variable	**Transformation**
SIZE	**Log: LN(SIZE)**
PROF	**Reciprocal: 1/(1+PROF)**
TOTAL(S)	**Reciprocal: 1/(1+TOTAL(S))**

Table 9.11 and 9.12 present the descriptive statistics and the test of normality for the transformed data. It can be seen that skewness and kurtosis all can be accepted as normal for all variables. Although Kolmogorov-Smirnov and Shapiro-Wilk values mostly reject data from normal, the means and medians are close to each other. Hence, data are assumed to be approaching normality.

Table 9.11

Descriptive statistics (electricity supply industry) – data transformation (social disclosure)

Variable	Mean	Median	Std. Deviation	Skewness	Kurtosis
MNGR	0.368	0.33	0.091	0.535	5.822
AGE	11.82	13	4.366	-0.791	0.090
LnSIZE	3.09	3.09	0.054	0.348	0.281
RecPROF	1.03	1.03	0.066	0.292	10.264
LEV	1.05	0.71	1.459	0.348	0.003
RecTOTAL(S)	0.16	0.17	0.036	-0.778	-0.029

Note: N = 73

Table 9.12

Test of normality (electricity supply Industry) (social disclosure)

	Kolmogorov-Smirnov		Shapiro-Wilk	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.264	0.000*	0.853	0.000*
AGE	0.157	0.000*	0.929	0.000*
LnSIZE	0.129	0.004*	0.979	0.248
RecPROF	0.159	0.000*	0.819	0.000*
LEV	0.224	0.000*	0.760	0.000*
RecTOTAL(S)	0.205	0.000*	0.866	0.000*

***P < 0.05**

Note: significance levels are required to approach 0.5 to be considered as normal.

Table 9.13 presents transformations for the chemical industry. Company SIZE and LEV were transformed under nature log, and PROF was transformed under reciprocal function operation.

Table 9.13

Data transformation for chemical industry (social disclosure)

Variable	Transformation
SIZE	**Log: Ln(SIZE)**
PROF	**Reciprocal: 1/(1+PROF)**
LEV	**Log: Ln(LEV)**

Tables 9.14 and 9.15, show data transformation bringing the skewness and kurtosis to an acceptable level for normality. Hence, data were assumed to be normally distributed.

Table 9.14

Descriptive statistics (chemical industry) – data transformation (social disclosure)

Variable	Mean	Median	Std. Deviation	Skewness	Kurtosis
MNGR	0.356	0.33	0.419	1.238	1.256
AGE	8.82	10.00	5.697	-0.141	-1.475
LnSIZE	21.06	20.87	0.817	0.422	-0.317
RecPROF	0.96	0.97	0.050	-0.541	3.875
LnLEV	-0.58	-0.35	1.298	-0.217	0.385
TOTAL(S)	4.96	5.00	1.086	1.154	1.359

Note: N = 73

Table 9.15

Test of normality (chemical industry) (social disclosure)

	Kolmogorov-Smirnov		Shapiro-Wilk	
Variables	**Statistic**	**Sig.**	**Statistic**	**Sig.**
MNGR	0.404	0.000*	0.680	0.000*
AGE	0.144	0.001*	0.891	0.000*
LnSIZE	0.126	0.006*	0.970	0.076
RecPROF	0.136	0.002*	0.924	0.000*
LnLEV	0.086	0.200	0.989	0.817
TOTAL(S)	0.250	0.000*	0.808	0.000*

Univariate statistics

Univariate analysis was employed to provide the relationships between each dependent and independent variable (Coakes et al., 2010). In particular, it focuses on the correlation between the dichotomous variable and continuous variables, as well as the strength of the relationships and the possibility of multicollinearity (Field, 2009).

Test of multicollinearity in a univariate setting

The presence of multicollinearity is considered to be problematic when analysing multivariate regressions. In this setting, a correlation matrix was employed to indicate the existence of multicollinearity. Coakes et al. (2010) suggests that multicollinearity is

identified if any of the squared multiple correlations are near or equal to 1. Field (2009) further explains that if correlations are above 0.8 or 0.9, multicollinearity exists. Nonetheless, the inclusion of the offending variables needs to be reconsidered. Tables 9.16, 9.17 and 9.18 present the correlations between each variable for mining, electricity supply, and chemical industries respectively. As shown in the table, all variables obtain correlations less than 0.80; therefore they do not include any harmful multicollinearity in the regression models.

Table 9.16

Test of multicollinearity (mining industry) – Univariate(social disclosure)

		GOWN	MNGR	MIA	AGE	RecPROF	LnSIZE	LEV
GOWN	Pearson Correlation	1						
	Sig. (1-tailed)							
MNGR	Pearson Correlation	.026	1					
	Sig. (1-tailed)	.329						
MIA	Pearson Correlation	-.053	-.125	1				
	Sig. (1-tailed)	.361	.205					
AGE	Pearson Correlation	-.097	.215	.245*	1			
	Sig. (1-tailed)	.004	.002	.000				
RecPROF	Pearson Correlation	.192	-.022	-.290*	-.045	1		
	Sig. (1-tailed)	.000	.013	.027	.006			
LnSIZE	Pearson Correlation	.394**	.072	.233	-.204*	-.218	1	
	Sig. (1-tailed)	.000	.001	.062	.001	.080		
LEV	Pearson Correlation	.064*	-.155	.211	.106	.394*	.046	1
	Sig. (1-tailed)	.041	.003	.044	.006	.005	.035	

Table 9.17

Test of multicollinearity (electricity supply industry) – Univariate(social disclosure)

		GOWN	MIA	AGE	LnSIZE	RecPROF	LEV	MNGR
GOWN	Pearson Correlation	1						
	Sig. (1-tailed)							
MIA	Pearson Correlation	.098	1					
	Sig. (1-tailed)	.204						
AGE	Pearson Correlation	-.144	.122	1				
	Sig. (1-tailed)	.002	.013					
LnSIZE	Pearson Correlation	.345**	.348	.279	1			
	Sig. (1-tailed)	.001	.002	.013				
RecPROF	Pearson Correlation	-.301	-.049	-.011	.068	1		
	Sig. (1-tailed)	.009	.042	.006	.003			
LEV	Pearson Correlation	.378**	.071	-.117	-.036*	-.187*	1	
	Sig. (1-tailed)	.003	.086	.052	.039	.019		
MNGR	Pearson Correlation	-.076	-0.130	.089	-.131	.010	-.081	1
	Sig. (1-tailed)	0.034	0.006	0.015	0.021	0.380	0.006	

Table 9.18

Test of multicollinearity (chemical industry) – Univariate(social disclosure)

		GOWN	MNGR	MIA	AGE	LnSIZE	RecPROF	LnLEV
GOWN	Pearson Correlation	1						
	Sig. (1-tailed)							
MNGR	Pearson Correlation	-.004	1					
	Sig. (1-tailed)	.001						
MIA	Pearson Correlation	.047	-.282	1				
	Sig. (1-tailed)	.347	.009					
AGE	Pearson Correlation	.130	-.055	-.118	1			
	Sig. (1-tailed)	.000	.004	.000				
LnSIZE	Pearson Correlation	.104	-.007	-.014	.331**	1		
	Sig. (1-tailed)	.001	.016	.000	.002			
RecPROF	Pearson Correlation	.196	.056	-.229	.541**	.142	1	
	Sig. (1-tailed)	.003	.046	.000	.000	.122		
LnLEV	Pearson Correlation	.244*	.028	-.159	.528**	.337**	.526**	1
	Sig. (1-tailed)	.022	.000	.040	.000	.002	.000	

Univariate analysis

In this section, Pearson correlation was employed to determine the relationship between the dependent, TOTAL(S) (total social disclosure of GRI information), and independent variables, including GOWN (government ownership), AGE (company listing years), MIA (membership of industrial association), PROF (profitability), LEV (leverage) and SIZE (company size). The results from the Pearson correlation analysis are presented tables 9.19, 9.20 and 9.21 for mining, electricity supply, and chemical industries respectively.

Cohen (1988) indicates that the absolute value of r is the determinants for Pearson correlation in univariate analysis. Weak correlations exist when the absolute value of r falls between 0.1 and 0.299; moderate correlations exist when the absolute value of r falls between 0.3 and 0.499; strong correlations exist when the absolute value of r falls between 0.5 and 1. In respect with mining industry, results from Pearson correlation show that GOWN (r = -0.347), MNGR (r = -0.395), RecPROF (r = 0.446), LnSize (r = -0.489) and LEV (r = -0.334) are moderate significantly correlated with the dependent variable TOTAL(S), and all these variables are significant the 0.01 level (see table 9.19). AGE (r = -0.223) and MIA (r = -0.163) were not found to be at 0.01 significance level, therefore the correlations were comparatively weak.

Table 9.19

Results from Pearson correlation (mining industry) (social disclosure)

		Expected Sign	RecTOTAL(S)
GOWN	Pearson Correlation	-	-0.347
	Sig. (1-tailed)		0.008**
MNGR	Pearson Correlation	-	-0.395
	Sig. (1-tailed)		0.001**
MIA	Pearson Correlation	-	-0.163
	Sig. (1-tailed)		0.106
AGE	Pearson Correlation	-	-0.223
	Sig. (1-tailed)		0.055
RecPROF	Pearson Correlation	+	0.446
	Sig. (1-tailed)		0.000**
LnSIZE	Pearson Correlation	-	-0.489
	Sig. (1-tailed)		0.000**
LEV	Pearson Correlation	-	-0.334
	Sig. (1-tailed)		0.004**

*Note: *p < 0.05; **p < 0.01*

Since the dependent variable TOTAL(S), which is the total social disclosure under GRI, was inversed during data transformation, the relationship between the original dependent variable, TOTAL(S), was expected to have opposite sign as previously discussed.

Table 9.20 presents the results from Pearson correlation analysis of electricity supply industry. GOWN (r = -0.301), MNGR (r = -0.478), RecPROF (r = 0.348), LnSIZE (r = -0.345) and LnLEV (r = -0.398) were found to have moderate correlations with TOTAL(S), and the correlations are significant at the 0.01 level. MIA (r = -0.229) and AGE (r = -0.279) were found to have weak correlations, and their significance levels were found to be at the 0.05 level.

Table 9.20

Results from Pearson correlation (electricity supply industry) (social disclosure)

		Expected Sign	RecTOTAL(S)
GOWN	Pearson Correlation	-	-0.301
	Sig. (1-tailed)		0.006**
MNGR	Pearson Correlation	-	-0.478
	Sig. (1-tailed)		0.000**
MIA	Pearson Correlation	-	-0.229
	Sig. (1-tailed)		0.026*
AGE	Pearson Correlation	-	-0.279
	Sig. (1-tailed)		0.013*
RecPROF	Pearson Correlation	+	0.348
	Sig. (1-tailed)		0.002**
LnSIZE	Pearson Correlation	-	-0.345
	Sig. (1-tailed)		0.002**
LnLEV	Pearson Correlation	-	-0.398
	Sig. (1-tailed)		0.001**

*Note: *p < 0.05; **p < 0.01*

Since the dependent variable TOTAL(S), which is the total social disclosure under GRI, was inversed during data transformation, relationship between dependent variable, TOTAL(S), was expected to have opposite sign. Since variable PROF was inversed during data transformation also, the relationship between independent variable RecPROF and TOTAL(S) was still expected to be positive.

The results from Pearson correlation analysis of chemical industry were presented in table 9.21. It is found that LnSIZE (r = -0.543) was strong correlated with TOTAL(S) at the 0.01 significance level. MNGR (r = -0.442) and LEV (r = -0.387) were moderately correlated at the 0.05 significance level. MIA (r = -0.219), AGE (r = -0.291) and RecPROF (r = -0.247) were found to have weak correlations with TOTAL(S) at the 0.05 significance level. GOWN (r = -0.177) also has weak correlation; however, the significance level was found to be approaching the 0.05 level.

Table 9.21

Results from Pearson correlation (chemical industry) (social disclosure)

		Expected Sign	RecTOTAL(S)
GOWN	Pearson Correlation	-	-0.177
	Sig. (1-tailed)		0.067
MNGR	Pearson Correlation	-	-0.442
	Sig. (1-tailed)		0.000**
MIA	Pearson Correlation	-	-0.219
	Sig. (1-tailed)		0.031*
AGE	Pearson Correlation	-	-0.291
	Sig. (1-tailed)		0.011*
RecPROF	Pearson Correlation	+	-0.247
	Sig. (1-tailed)		0.039*
LnSIZE	Pearson Correlation	-	-0.543
	Sig. (1-tailed)		0.000**
LEV	Pearson Correlation	-	-0.387
	Sig. (1-tailed)		0.001**

*Note: *p < 0.05; **p < 0.01*

Multivariate statistics

Multiple regressions analysis is used when independent variables are correlated with one another and with the dependent variable (Coakes et al., 2010). Therefore, multivariate statistics was conducted to test the seven directional hypotheses variables.

Testing of multicollinearity in a multivariate setting

A number of assumptions underpin the use of regressions: ratio of cases to independent variables, outliers, multicollinearity and singularity, normality, linearity, homoscedasticity and independence of residual (Coakes et al., 2010). Ratio of cases to independent variables requires that sample size is only acceptable when it is at least 5 times more than independent variables. In this study, the sample size was larger than that required. Apart from multicollinearity, the other assumptions have been previously discussed; therefore they will not be specifically introduced again in this section.

Multicollinearity refers to high correlations among the independent variables exists. These problems affect the interpretation of relationships between the predictors and the

dependent TOTAL(S) variable. To maintain the quality of the multiple regressions, a test of multicollinearity will be considered to detect the magnitude of the variance inflation factor (VIF). Coakes et al. (2010) indicates that the regression model may be biased by multicollinearity when VIF is greater than 10. Another indicator for multicollinearity is tolerance. Yuan (2007) suggests that high collinearity exists when the tolerance coefficient is less than 0.2 and close to zero. Tables 9.22, 9.23 and 9.24 present the results of the tests of multicollinearity for mining, electricity supply and chemical companies. The tables show that the T values and VIF ranged in an acceptable level, and no harmful indicators can be obtained from the results.

Table 9.22

Test of multicollinearity (mining) – multivariate (social disclosure)

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
GOWN	0.648	1.708
MIA	0.743	1.894
AGE	0.842	1.488
LnSIZE	0.901	1.584
RecPROF	0.961	1.510
LEV	0.716	1.629
MNGR	0.801	1.339

Table 9.23

Test of multicollinearity (electricity supply) – multivariate (social disclosure)

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
GOWN	0.614	1.628
MIA	0.962	1.040
AGE	0.962	1.040
LnSIZE	0.730	1.370
RecPROF	0.877	1.140
LEV	0.740	1.352
MNGR	0.961	1.040

Table 9.24

Test of multicollinearity (chemical) – multivariate (social disclosure)

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
GOWN	0.838	1.193
MIA	0.706	1.850
AGE	0.693	1.049
LnSIZE	0.774	1.255
RecPROF	0.813	1.420
LnLEV	0.557	1.796
MNGR	0.612	1.514

In this study, both tolerance and VIF are considered as acceptable for undertaking to regression model. The results indicate that all variables were not materially affected by multicollinearity.

Multiple regressions

This subsection presents the results from the ordinary least squares multiple regressions analysis. The result from each sample industry is discussed separately.

Since dependent variable TOTAL(S) was inversed during data transformation, relationships between independent variables GOWN, MIA, AGE, LnSIZE, LEV and MNGR were expected to be negative. Therefore, the expected signs should be opposite to their previous designation. Since the direction of distribution of variable PROF was inverted during data transformation, the relationship between independent variable and dependent variable TOTAL(S) was still expected to be positive.

The results from multiple regressions for the mining industry show the model to be statistically significant (R^2 = 0.381, F = 31.332, P = 0.000) (see table 9.25). This indicates that the relationship between the dependent variable (TOTAL(S), the total number of social disclosure in mining industry) and the independent variable (PROF, profitability) is statistically significant at the 0.01 level. Variables LEV (leverage ratio), MNGR (number of independent director ratio) and SIZE (company size) are significant at 0.05 level. Variable GOWN (governmental ownership) and AGE (company listing age) are not significant, but they are approaching significant. Variable MIA (member of industrial association) is not found to be significant in the multiple regressions.

Importantly, all variables in the mining industry were found in the expected direction in both univariate and multivariate analysis.

Table 9.25

Results of multiple regressions (mining industry) (social disclosure)

Model	**R^2**	**F**	**Sig. (1-tailed)**
Regression	0.381	31.332	0.000*

Note: Predictors: (Constant), RecPROF; *p < 0.05

Table 9.25

Results of multiple regressions (mining industry) (social disclosure) (Cont'd)

Variable	**Hypothesis**	**Expected sign**	**B**	**Beta**	**T**	**Sig. (1-tailed)**
GOWN	H1	-	-	-0.312	-1.696	0.100*
MIA	H3	-	-	-0.395	-1.509	0.074*
AGE	H6	-	-	-0.388	-1.494	0.062*
LnSIZE	H7	-	-0.417	-0.495	-2.841	0.021**
RecPROF	H4	+	0.390	0.565	-5.426	0.000***
LEV	H5	-	-0.374	-0.437	-5.140	0.020*
MNGR	H2	-	-0.255	-0.423	-4.811	0.043**

Note: N = 47; *p < 0.1; **p < 0.05; ***p < 0.01

Since dependent variable TOTAL(S) was inverted during data transformation, the relationship between independent variables GOWN, MIA, AGE, LnSIZE, LEV and MNGR were expected to be negative. However, the direction of distribution of variable PROF was reversed during data transformation, but the relationship between the independent variable and dependent variables TOTAL(S) was still expected to be positive.

Results from multi-regressions showed the model was statistically significant (R^2 = 0.429, F = 31.006, P = 0.001) (see table 9.26). The results indicate that the dependent variable (TOTALS) is significantly correlated with the independent variable PROF at 0.01 level; variables SIZE, LEV and MNGR are moderate significant at 0.05 level. Variables GOWN and MIA were not significant but they are approaching significant. AGE was not found to be significant in the analysis. Interestingly, all independent variables in electricity supply were shown to have the expected signs of direction.

Table 9.26

Results of multiple regressions (electricity supply industry) (social disclosure)

Model	**R^2**	**F**	**Sig. (1-tailed)**
Regression	0.429	31.006	0.001*

Note: Predictors: (Constant), RecPROF; *p < 0.05

Table 9.26

Results of multiple regressions (electricity supply industry) (social disclosure) (Cont'd)

Variable	**Hypothesis**	**Expected sign**	**B**	**Beta**	**T**	**Sig. (1-tailed)**
GOWN	H1	-	-	-0.189	-1.497	0.0874*
MIA	H3	-	-	-0.285	-1.720	0.0633*
AGE	H6	-	-	-0.155	-0.666	0.1581
LnSIZE	H7	-	-0.214	-0.413	-3.519	0.0191**
RecPROF	H4	+	0.257	0.503	5.622	0.000***
LEV	H5	-	-0.284	-0.447	-5.124	0.0114**
MNGR	H2	-	-0.326	-0.393	-3.727	0.0279**

Note: N = 73; *p < 0.1; **p < 0.05;***p < 0.01

Since dependent variable TOTAL(S) was inverted during data transformation, relationship between independent variables GOWN, MIA, AGE, LnSIZE, LnLEV and MNGR were expected to be negative. The direction of distribution of variable PROF was reversed during data transformation, but the relationship between independent variable and dependent variable TOTAL(S) was still expected to be positive.

The regressions results from the chemical industry data indicate R^2 of 0.392, which is statistically significant (F=33.948; P=0.000) (see table 9.27). Two variables (SIZE and MNGR) were found to be significant at 0.01 level. AGE and LEV were shown to be moderate significant at 0.05 level. Variables GOWN and PROF were found not to be significant but they are approaching significant. MIA was found to be insignificant. Notably, all variables were in the expected direction.

Table 9.27

Results of multiple regressions (chemical industry) (social disclosure)

Model	**R^2**	**F**	**Sig. (1-tailed)**
Regression	0.392	33.984	0.000**

Note: Predictors: (Constant), LnSIZE, MNGR; *p < 0.05

Table 9.27

Results of multiple regressions (chemical industry) (social disclosure) (Cont'd)

Variable	**Hypothesis**	**Expected sign**	**B**	**Beta**	**T**	**Sig. (1-tailed)**
GOWN	H1	_	-	-0.149	-1.413	0.082*
MIA	H3	-	-	-0.126	-0.501	0.139
AGE	H6	-	-0.413	-0.317	-3.683	0.016**
LnSIZE	H7	-	-0.353	-0.504	-5.277	0.000***
RecPROF	H4	+	+	0.315	1.509	0.073*
LnLEV	H5	-	-0.246	-0.299	-2.017	0.044**
MNGR	H2	-	-0.297	-0.513	-6.166	0.000***

Note: N = 73; *p < 0.1; **p < 0.05; ***p < 0.01

Discussion of results

Multivariate analysis into voluntary social disclosure has been conducted in previous subsection, and it generated an acceptable level of R^2 in all selected sample industries. It is apparent that certain variables from legitimacy theory are able to explain the extent of voluntary social disclosure in Chinese mining, electricity supply and chemical companies' annual reports, whereas some variables are less able to. The results showed that all three models were significantly associated with the extent of social disclosure. In mining industry, PROF (profitability) was a significant variable with the R^2 ($F = 31.332$; $p = 0.000$), which means that hypothesis four is accepted and it supports legitimacy theory. SIZE (company size), LEV (leverage ratio), and MNGR (number of independent directors ratio) were found to be moderately significant; therefore, hypotheses two, five and seven are accepted. Although variables AGE, MIA and GOWN were shown to be insignificant, they approached the moderate significance level. More importantly, all of the independent variables had the expected sign directions.

Similarly, the model for electricity supply industry is significantly associated with the extent of social disclosure. PROF is found to be significant (R^2 = 0.429; F = 31.006; p = 0.001) and hypothesis four is accepted. SIZE, LEV and MNGR, again, were found to be moderately significant, and they are also accepted to support legitimacy theory. GOWN and MIA were found to be insignificant; therefore hypotheses one and three are rejected. Mirroring to the previous model, all variables have the expected sign directions.

Interestingly, the model for chemical industry was also found to be significant with an R^2 of 0.392 (F = 33.984; p = 0.000). Hypotheses two and seven are accepted and they were both found to be statistically significant. Variable LEV and AGE were found to be moderate significant, nonetheless, they approach 0.01 significance level. GOWN, MIA and PROF were found to be insignificant; however, all variables show the expected sign directions.

Look over the results in the regression analysis for social disclosure, hypothesis one, which is if a company is state-owned, is rejected for all three sample industries as the p values are less than the moderate significance level ($p<0.05$). This means that whether a mining, or electricity supply, or chemical company is owned by the government does not influence the extent of its corporate social disclosure. Results for the proxy 'government ownership' from previous studies were shown not to be stable. Yang (2005) conducted a case study into five state-owned firms and found that they disclose more social information than non-state owned firms; however, Li (2009) found whether a company is state-owned has no influence to the extent of corporate social disclosure. The results from this study show that whether a company belongs to the state will not have direct impact on its social responsibility information disclosure; however, the key is whether the competent and local authorities, such as the State-owned Assets Supervision and Administration Commission of the state council (SASAC), have actively promoted and encouraged disclosing social information, because these authorities have more direct impact on the companies. The influence of directors from the government has been shown to be almost negligent.

Members of industrial association are not statistically significant for all three industries. Industrial association provides supervision and monitoring activities to industrial companies in order to improving their environmental performance; however, the results suggest that whether a company is a member of industrial association does not influence

the extent of corporate social reporting. Therefore, hypothesis two is rejected for all three industries.

Years of a company become listed is also not statistically significant for mining and electricity supply industries, although it is moderate significant ($0.1<p<0.5$) for chemical industry. This suggests that whether a company has been listed sufficiently long enough does not influence the extent of corporate social disclosure. Hence, hypothesis three is rejected for mining industry and electricity supply industry.

Company size is one of the most significant predictor variables influencing the extent of corporate social disclosure in all three industries, and it suggests that the lager the scale of a company, the greater extent its social disclosure. This result is similar to Li (2007), Peng (2009), Zhao (2007) and Liu (2009). There are more public exposures to the big firms from the media. Since these firms are social sensitive, they disclose more information. Also, it could be that the political costs are slightly higher for the large-scale firms. Due to the economic scale of the firms, the cost for disclosing social information is relatively lower than the small firms. Hence, the extent of social disclosure is higher for large-scale companies.

Profitability is also found to be statistically significant in mining and electricity supply industries since the p values are less than 0.1. This suggests that more profitable mining and electricity supply companies have a greater extent for corporate social disclosure. Profitability was found statistically insignificant in the chemical industry.

Influences of company leverage on the extent of corporate social disclosure are shown to be moderate significant in all three industries. Similar to Li (2006) and Chu (2007), this suggests that higher leveraged companies disclose more social information. Highly leveraged firms are more likely to show their relevant stakeholders, such as financial institutions, that they have made effort to social responsibility and the effectiveness as a result.

Management role is found to be statistically significant in all three industries. As directors are directly involved in the administration of a company, the higher numbers of independent director may ensure better responsibility has been undertaken. The result suggests that companies with management, who has exercised the duty of honesty and loyalty, are more likely to disclosure more corporate social information in annual reports.

Comparison of results

The standardised beta test across industries is compared in this section. As the previous chapter indicated, due to the necessary data transformation, the nature of the logarithm for leverage ratio was chemical industry was reverted from Ln(LEV) to leverage (LEV). The result of LEV for chemical industry was not shown to be statistically significant, barely approaching 0.1 significance level (beta = 0.381, T = 3.417, p = 0.112).

Table 9.28

Comparison of standardised beta across industries (social disclosure)

Variable		**Mining Industry**	**Electricity Supply Industry**	**Chemical Industry**
GOWN	Beta	-0.312	-0.189	-0.149
	Sig.	0.100	0.087	0.082
MIA	Beta	-0.395	-0.285	-0.126
	Sig.	0.074	0.063	0.140
AGE	Beta	-0.388	-0.155	-0.317
	Sig.	0.062	0.158	0.016*
LnSIZE	Beta	-0.495	-0.413	-0.504
	Sig.	0.021*	0.019*	0.000**
RecPROF	Beta	0.565	0.503	0.315
	Sig.	0.000**	0.000**	0.073
LEV	Beta	-0.437	-0.447	-0.381
	Sig.	0.020*	0.011*	0.112
MNGR	Beta	-0.423	-0.393	-0.513
	Sig.	0.043*	0.028*	0.000**

Note: **p < 0.01; *p < 0.05

Table 9.31 presents the comparison of standardised beta across mining, electricity supply and chemical industries with respect the companies' voluntary social disclosure in annual reports. These industries share much in common based on legitimacy theory and they are found to be empirically identical. SIZE is found to be significant in both the mining industry and electricity supply industry, and the extent of PROF's influences is similar; they have betas of 0.565 and 0.503 respectively. Although it was found to be

insignificant in chemical industry, the p value of SIZE approached the moderate significance level with a beta of 0.315. Variable SIZE was found to be significant in all sample industries. It is most significant that the chemical companies had a beta of 0.504. SIZE influences to a lesser extent than in the other two industries, where the betas are 0.495 and 0.413. In addition, MNGR of the chemical industry similarly has the highest value of beta; this was shown to be statistically significant. The mining industry and electricity industry, had betas of 0.423 and 0.393. For variable LEV, mining and electricity supply industries had moderate significance levels, and it influences mining industry with beta of 0.437. Electricity supply was influenced the most with a beta value of 0.447. Since this variable was transformed back to LEV, it is no longer significant to chemical industry. AGE was only found to be significant in chemical industry, and the remaining sample industries sampled were found to have largely insignificant levels, approaching moderate significance level at best.

Interestingly, GOWN and MIA were found to be insignificant in all three industries; however, the p values approach moderate significance level and their signs meet the expected signs directions. The overall comparison indicates that the empirical evidence shows most of the hypothesised variables are able to explain the extent of social disclosure in Chinese mining, electricity supply, and chemical companies. There are four independent variables, SIZE, PROF, LEV and MNGR, which the sample companies have in common, indicate whether they influence and determine the extent of social disclosure. Moreover, GOWN and MIA were found to be insignificant in all industries while approaching moderate significance level. Therefore, the results reveal that overall, the three industries were determined by the same variables, and that it may be possible to have the three industries included in one model instead of three.

Summary

This chapter has presented, discussed and compared the results of the tests developed to investigate the hypotheses formulated for social disclosure. The results indicate that most of the hypothesised variables explain the extent of social disclosure in annual reports, and they have influence approximately to a similar in extent across industries. The next chapter will present summaries of chapters, the findings of this study, implications and limitation of the study, as well as suggestions for further research.

CHAPTER 10

CONCLUSION

Introduction

This chapter will present summaries in relation to the previous chapters, and major findings and discussions of this study in respect of the environmental and social disclosures and statistical analysis. Implications of the study, limitations and suggestions for future research will also be shown in this chapter.

Summary

Chapter Two presented the development of environment and social disclosure guidelines and practices in China and explained the reasons for choosing the Global Reporting Initiative (GRI) for this study. This chapter also has reviewed the legal system and regulations on environment and social disclosure in China.

Chapter Three described a review of literature on the studies of determinants of environmental and social disclosures in China. The studies reviewed were grouped into studies of determinants of social disclosures and studies of determinants of environmental and social disclosures. The literature review provided conceptual and theoretical resources, from which the author was able to construct an appropriate theoretical framework and methodology. It also showed the existing limitations and construct basis for this study.

Chapter Four elaborated the legitimacy of the theoretical framework and justified its importance and relevance to environmental and social disclosures in China due to its specific situation. In this chapter, seven explanatory variables were developed based on legitimacy theory: government ownership, management role, member of industrial association, profitability, operating leverage, company age, and company size.

Chapter Five outlined the research methodology employed in this study. As outlined in the aim and research questions in Chapter one, sample selection, research design, data collection, research coding method and description of data analysis were included in this chapter.

Chapters Six and Seven presented and discussed environmental and social disclosures analysis of the 2010 Chinese mining, electricity supply and chemical firms' annual reports. The analysis examined the type and extent of corporate social and environmental disclosures in relation to the G3 guidelines. These chapters answered research question one.

Chapters Eight and Nine described a series of statistical analyses to evaluate the associations between the extent of environmental and social disclosures and the firms' specific variables developed based on legitimacy theory. Data analysis included descriptive statistics, univariate analysis and multivariate analysis. Comparisons of results were also made in this section. These chapters answered research questions two and three.

Findings of the study

Findings of environmental disclosures

The results from environmental disclosure analysis show that the amount of environmental information disclosed by Chinese mining, electricity supply, and chemical industries are almost identical. Material, energy, emissions, effluents and waste and overall are the most important categories in terms of environmental disclosures, because they were the most commonly reported categories across industries. Mining companies reported 10% more than electricity supply companies and 33% more than chemical firms. These categories are the most publicly concerned issues, and companies are more likely to compare against each other to disclose such sensitive information. Another reason could be the Five Years Sustainable Plan, where information regarding companies' use of material, energy consumption and general performance on environment is encouraged in annual reports. Nonetheless, disclosure is on a voluntary basis; some companies choose to follow the advice while some do not. In addition, as suggested by legitimacy theory, environment-sensitive industries are more likely to face legitimacy issues and directors in those companies are more likely to disclose relevant information in order to promote or rescue companies' social acceptance. This could be the reason that mining companies disclose more information than the other two industries. The China Electricity Council has indicated that the Chinese mining industry has become increasingly concerned nationally about its environmental performances. It is ranked as the top environmentally concerned industry

by Chinese industrial association, and is also sensitive to the public's concern about its matter.

However, it is found in the study that the extent of environmental disclosures in all industries is typically low. There are 2.68 disclosures per mining company, 2.42 per electricity supply company and 1.82 per chemical company out of 30 disclosures in total, and information disclosed is not reflected in detail. Most of the companies chose to report general environmental information rather than specific performances. Therefore, it is concluded in all three industries that companies are still not willing to report specific environmental information in detail in annual reports.

In data analysis, it is found that all explanatory variables have individual associations with the dependent variable, the extent of environmental disclosures. The univariate analysis shows that management role, member in industrial association, company age, profitability, company size, and leverage are significantly correlated with the dependent variable. Profitability has the strongest correlation in both mining and chemical industry, whereas membership of industrial associations is the strongest in electricity supply industry. Government ownership is not significant in any of the three sample industries.

The results of multivariate analysis indicate that there are certain variables from legitimacy theory that are able to influence the extent of environmental disclosures across all three industries. In the mining industry, profitability and membership in industrial associations are the most significant, followed by company size and company listing age. In the electricity supply industry, membership in industrial associations, operation leverage, and company listing age are the most significant, and company size is considered moderately significant, with the variables profitability and management role, approaching moderate significance level. Similarly in chemical industry, profitability and member of industrial association are the most significant, followed by company age and company size. The overall results show that there are four common variables that are positively significant in all industries: member of industrial association, company age, company size and profitability. The variable management role approaches moderate significance in mining and electricity supply industry, with operating leverage approaching moderate significance in the chemical industry, and significant correlation can be observed in electricity supply industry. The remaining variables (government ownership, leverage and management role) were found to be

insignificant in all industries. Nonetheless, all independent variables were found to have the positive signs that the hypotheses expected.

Findings of social disclosures

The results from descriptive analysis of social disclosure indicate that the average amount of disclosed social information is similar in all three industries: there were 5.49, 5.55 and 4.96 disclosures per mining, electricity supply and chemical company in the 2010 annual reports. This suggests that the sample industries have paid an equal amount of attention on their social reporting. Nonetheless, the numbers of social items disclosed were still low and the range is from 4 to 15, 4 to 14 and 4 to 9 for mining, electricity and chemical industries respectively out of a total of 39 social items in the G3 guidelines. Interestingly, all sample companies have reported some social information, which suggests that all companies were willing to disclose a small amount of social information; however, companies are still reluctant to disclose social information in detail.

In respect of the categories in social disclosure, labour practices and decent work and human rights are the most commonly reported across industries. In particular, LA1, LA10, LA12 and HR3 are the most common items reported by all companies. This is because workforces were specifically concerned by the public in environment-sensitive industries, and whether to report what and how much welfare that labour receive in these industries has become one of the most debatable issues in China. In addition, due to the financial crisis, fraud caused by internal employees has turned out to be a major issue both internationally and domestically. Information regarding internal human resources attracts extensive media attention. As these are the most public sensitive issues, companies therefore are more likely to report information in relation to labour and human rights in order to retain a high level of reputation in China.

In univariate analysis, all variables were found to be significantly correlated with the dependent variable (the extent of social disclosure) individually. Profitability, company size and management role are the most significant in the mining industry. Similarly, management, government ownership and company size, as well as leverage are significant in the electricity supply industry, and member of industrial association is moderately significant. In the chemical industry, company size, leverage and company age are positively significant; the remaining variables, government ownership,

management role, profitability and member of industrial association are moderately significant or approaching moderate significance.

In multivariate analysis, all models were found to be statistically significant. The results indicate that while some variables are able to explain the association with the extent of social disclosure, some are not. There are three common variables that are able to explain this association to be significant across all industry: company size, operating leverage, and management role. Profitability is positively significant in both mining and electricity supply industry; however, no significance is found in chemical companies. The remaining variables, government ownership, member of industrial association and company age were found to be insignificant in the sample companies. Nonetheless, all variables were shown to have the expected signs. Therefore, it is possible to conclude that since the three industries have the same characteristics in relation to the extent of social disclosure, they may need only one single model in order to determine this association rather than having one model for each.

Implications of the study

The research questions were answered based on the findings from the previous chapters; hence, this study provides the type and the extent of corporate environmental and social disclosure in 2010 Chinese mining, electricity supply and chemical industries' annual reports. In addition, it examines and demonstrates the determinants of corporate environmental and social disclosure in 2010 annual reports in relation to the GRI Guidelines by employing legitimacy theory. This study also addresses that mining, electricity supply and chemical industries are identical with respect the extent of environmental and social disclosures under the GRI guidelines.

In the environmental dimension with respect legitimacy theory, the hypothesised variable, member of the local industrial association for a sample company (MIA), was found to have a strong significant relation to the extent of environmental disclosures. The inference is that the local industrial associations in China, such as Chinese Mining Federation, Chinese Electricity Council and Chinese Chemical Industrial Association, have played important roles, encouraging corporate boards and managements to voluntarily disclose environmental information; however, the descriptive statistics provide evidence that there were only 2.68 indicators per mining company, 2.42 indicators per electricity supply company and 1.82 per chemical company. This

suggests that the disclosure manner for the sample companies can be influenced effectively by industrial associations if they are the members, but the encouragement for disclosing a wide range with detailed information regarding environmental information was not sufficient. The implication is that the industrial association, more likely the government, will need to consider the prescription of the GRI as a reference when preparing environmental disclosures, and make it mandatory for listed companies to disclose this information since the extent of environmental disclosures is very low. The variable, MIA, was found to be significant in all sample industries. This suggests that the industrial associations in China have the identical amount of influence across industries.

In addition, the hypothesised variable in relation to companies financial features, profitability (return on asset) and leverage (debt to equity ratio), were found to be significant in Chinese mining and chemical industries, with weaker significant relationships were found in the electricity supply industry. Company size (total asset) and company age were found to have moderate significant relationship across industries. These variables, again, demonstrate that the sample industries have the identical determinants in terms of corporate financial features. This suggests that corporate with financial features in common tend to disclosure the same amount of environmental information in quantity. The implication is that economic features and activities that add value to companies are important factors that motivate corporate managements to disclose environmental information voluntarily. This further implicates that it is important for the government to link financial incentives with environmental information reporting, such as having subsidiaries for corporate pollution control. This will motivate the managements voluntarily disclose environmental information.

Interestingly, government ownership was found insignificant in the sample industries. This suggests that the management of Chinese listed mining, electricity supply and chemical companies were not motivated by the companies being stated-owned. As China develops, there has been increasing emergence of private sectors ownership in the last few decades, and whether a company is state-owned is no longer a strong motivation for the management to voluntarily disclose environmental information (Taylor & Shan, 2007). The reason that state-owned firms were no longer the pioneers for disclosure environmental information is that the government has not paid sufficient attention to environmental reporting. In order to increase the extent of environmental

disclosure in China, the government will need to have a set of detailed and adequate environmental reporting instructions, such as the GRI guidelines, as a mandatory requirement.

In the social dimension with respect legitimacy theory, corporate economic features, such as profitability, company size and leverage were found to have strong to moderate significant relationships to the extent of social disclosure in Chinese mining, electricity supply industries and chemical industries. This emphasises that the sample industries have identical determinants in relation to social disclosure. Similar to the environmental dimension, social disclosure remains at the voluntary basis in China, and incentives from the government can certainly play as a catalyst that motivates the management to disclosure more social information.

In addition, government ownership was found to have a weak significant relationship to the extent of social disclosure. This suggests that the governments in China have not been putting sufficient pressure on the state-owned firms, which are mostly financially successful companies and are assumed to take the leading roles for disclosure voluntary social information. Therefore, the government will need to have mandatory detailed social disclosing guidelines (i.e. the GRI) for the state-owned companies, which have been disclosing limited information ineffectively.

Besides, the variable, member of industrial association, was found to be insignificant in chemical industry, and weak significant relation in mining and electricity supply industries. This suggests that the industrial associations have limited influences on the social aspect, and the encouragement for corporate management is not effective; hence, it is clear that disclosures of social performances appears to be not very much required and instructed by the government and its agencies alike. The implication is that the industrial associations and the government will need to focus on the social aspect while retaining a high level of encouragement into disclosing environmental information, with the government setting mandatory social reporting instructions like the GRI guidelines.

Company age was also found to have weak significant relationship across industries. Older companies operate longer and would need more communication to the outside community; however, the results suggest that the influences of their wide social networks and public images do not motivate much the managements to disclosure social information. The implication is that the corporate managements are not concerned with

the social public image based on their company age. This, again, emphasises the importance to have a set of adequate and comprehensive mandatory social disclosure guidelines, such as the GRI guidelines.

The findings for this study also have implications to facilitate the annual reports users, preparers as well as regulators of financial information in China. It helps the annual report users to understand the sustainable aspect of a company when investing, and it provides an insight into the extent of environmental and social reporting in the sensitive companies in China. The users would also benefit from the study as a guide for decision making processes and understanding the influences of companies environmental and social reporting on their financial performances. Therefore, in the context of the Chinese market economy, this study provides report users a clear view into companies' legitimacy factors, understanding how environmental and social disclosures are influenced by financial performance and firm specific factors and encourage them to lobby for more information disclosure. The extent of both environmental and social disclosures indicate that the range of the G3 items should be reported rather than a few limited items, such as EN1, LA1, LA10, LA12 and HR3. This suggests that Chinese regulators, when preparing reporting standards, should be mindful of following the GRI, and consider setting the GRI as a mandatory requirement. In addition, the results show the reluctance for the Chinese companies to voluntarily disclose environmental and social information, which will be a challenge for the Chinese regulators when improving the existing environmental and social guidelines. Interestingly, it is found that the Chinese mining, electricity supply, and chemical industries have almost the same variables predicting the extent of environmental and social disclosures. This suggests that environmental and social sensitive industries under legitimacy theory have the identical company's specific features that influence the extent of their environmental and social disclosures.

Limitations and suggestions for future research

There are several limitations in this research. Firstly, the study is limited to the Chinese mining, electricity supply and chemical industries, and therefore it does not provide a generalised overview into other industries. Future studies can be extended to include other manufacturing industry sectors, and comparisons formed by a larger population may demonstrate and explain trends more clearly.

In addition, due to the changing and complex nature of the business environment, there can be inherent difficulties and restrictions to capture corporate environmental and social responsibility in a single period observation. Hence, the results will not show the trend of development of corporate environmental and social disclosure over several years. Future studies can apply a longitudinal method, whereby companies' annual reports from a number of years can be selected.

Also, the differences between state-owned, private Chinese-owned and internationally-owned firms may be interesting, as these firms might have different exposure to legitimacy factors. Variables regarding Chinese-owned and international-owned companies can be set as dummy variables in future extensions of this study, because companies' disclosing practices regarding environmental and social information may differ due to their ownership structures. However, this may create a limitation, where the sample size for international-owned firms is less than 4% among the entire samples. This may be too small to sustain appropriate statistical testing.

There are disadvantages for using annual reports. First, annual reports are not the only source that companies disclose environmental and social information with. Companies that have disclosed through stand-alone reports, web-site disclosure or media announcement may have less or none environmental or social information in annual reports. Second, it is completely voluntary for the companies to have environmental and social disclosures, and companies may choose not to disclose any information in annual reports. Third, there are not regulations or mandatory disclosure guidelines that companies can follow. What companies have disclosed may or may not match the guideline that is appropriate for a particular study. Therefore, information disclosed does not have a standard and it can be difficult for researchers to collect.

Also, there is a limitation for using dummy variables as proxies for 'government ownership' and 'management role' in the multiple regression models. Dummy variable

is effective and useful for testing categorical factors and their relationships between predictors and responsible variables. However, using dummy variable is a non-parametric approach which does not assume form for functional relationship (Cohen, 1991). Therefore, regressions included dummies often lose functional form of relationship and the slop of the regressions are most like to be influenced. Nonetheless, dummy variables are most commonly used by researchers in multiple regressions because the extent that they influence the slope is negligible.

Finally, this study focuses solely on the quantitative approach and hence a dichotomous index was employed to identify the extent of companies' environmental and social disclosures. The limitation of this method is that all items are being treated as equally important. Future research can overcome this by analysing both quantitative and qualitative approaches. For example, weighted index measures can be used to examine the level of importance of each GRI item of disclosure.

In conclusion, this study extends and contributes to the existing studies on corporate environmental and social disclosures in China in the following aspects: first, the study evaluates and measures the type and extent of company environmental and social disclosures solely using the Global Reporting Initiative (G3) as a benchmark among the most sensitive industries. Secondly, this study examines the relationship between the extent of environmental and social disclosures from sample companies in different industries and the companies' drivers of disclosure under the legitimacy theoretical framework. Finally, this study compared the differences in the sample Chinese mining, electricity supply and chemical companies in terms of the extent and the determinants of environmental and social disclosures in annual reports for 2010, a recent review.

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Appendix A: The English version of Shenzhen stock exchange social responsibility instructions to listed companies

Chapter I General Provisions

Article 1 These Instructions have been formulated in accordance with the *Company Law*, the *Securities Law* and other laws, administrative regulations and the rules of competent authorities for the purpose of implementing scientific outlook of social development, building social harmony, accelerating sustainable economic and social development and promoting commitment to social responsibilities.

Article 2 For the purpose of these Instructions, social responsibilities refer to the obligations listed companies should assume for the social development, for natural environment and resources, and for the interested parties including their shareholders, creditors, employees, customers, consumers, suppliers and communities.

Article 3 While pursuing economic results and protecting shareholders' interests, listed companies (hereinafter, Companies) should proactively protect the legitimate rights and interests of their creditors and employees, be honest and trustworthy towards their suppliers, customers and consumers, and commit themselves to social welfare services like environmental protection and community development in order to achieve social harmony.

Article 4 In business operations, Companies should follow the principles of free will, fair trade and good faith, observe moral and business ethics, and be subject to the supervision of the government and the public. They should not seek improper benefits by bribery, smuggling and other unlawful activities, nor infringe upon other people's intellectual properties like trademark, patent and copyright for the purpose of unfair competition.

Article 5 Companies shall, as required by these Instructions, perform their social responsibilities, make regular evaluation and issue voluntary disclosure on the performance.

Article 6 These Instructions apply to the companies whose shares are listed on Shenzhen Stock Exchange (hereinafter, Exchange).

Chapter II Protection of the Interests of Shareholders and Creditors

Article 7 Companies shall improve their corporate governance structure, treat their

shareholders fairly and ensure that their shareholders enjoy all the rights and interests as provided in laws, regulations and rules.

Article 8 Companies shall select appropriate time and venue for convening the shareholders' meeting. Online voting is advocated, in a view to facilitate shareholder participation in shareholders' meeting for the exercise of their rights.

Article 9 Companies shall fulfil their information disclosure obligations in strict accordance with laws, regulations, rules and the Exchange's rules. Voluntary disclosure is advocated with respect to information that may have an impact on the decision-making of shareholders and other investors. All investors shall be treated in a fair manner. Selective disclosure is prohibited.

Article 10 Companies shall formulate long-term and consistent profit distribution policies and methods and work out viable and reasonable bonus plans in return for the shareholders.

Article 11 Companies shall ensure that they are financially sound and their assets and capital are safe. Due regards shall be paid to creditors' interest. Maximization of shareholder interests shall not be made at the expense of creditor interests.

Article 12 In business operations and decision-making process, Companies shall give ample consideration to the legitimate rights and interests of their creditors and inform the creditors in a timely manner of the material information relating to the creditors' rights and interests. Companies shall furnish cooperation and support when the creditors seek access to Companies' financial, operational and management information for the purpose of protecting their interests.

Chapter III Protection of Employee Interests

Article 13 Companies shall strictly abide by the *Labour Law*, protect the legitimate rights and interests of their employees in accordance with law, establish and improve employment systems such as remuneration and incentives, and ensure that employees enjoy their rights and fulfill their obligations.

Article 14 Companies shall respect the dignity of the employees and guarantee their legitimate rights and interests, care for them, promote harmonious and stable relation between the employees and employer, and provide special labor protection to female employees in accordance with State regulations. They shall not unlawfully force employees to work, nor shall they inflict corporal punishment, physical or mental intimidation, verbal

humiliation or any other form of abuse.

Article 15 Companies shall establish and improve the system of occupational safety and health, strictly implement relevant rules and standards of the State, educate the employees accordingly, provide them with healthy and safe working and living environment, minimize the chance of accidents, and reduce occupational hazards.

Article 16 Companies shall follow the principles of pay based on work and equal pay for equal work. Pay shall not be deducted or delayed without justification. It is prohibited that temporary contracts or any other disguised probation contracts be signed with employees to reduce their wages and social security.

Article 17 Companies shall not interfere with employees' freedom of religious belief. No discrimination shall be imposed regarding employment, remuneration, training, promotion, dismissal or retirement due to ethnic community, race, nationality, religious belief, gender or age.

Article 18 Companies shall establish a vocational training system, mobilize and use the funds for vocational training in accordance with State regulations, make great efforts to train employees, encourage and support on-the-job training and continuing education for the purpose of providing more career development opportunities.

Article 19 Companies shall, in accordance with the provisions in the *Company Law* and their articles of association, establish a system for selecting and appointing directors and supervisors from among the employees so as to ensure that employees have full rights in corporate governance. Companies shall support the trade union to conduct legitimate activities. They shall solicit opinions, through the employee representative meetings or union meetings, on matters related to the interests of employees such as wages, welfare, occupational safety and health, and social insurance and pay due regards to employees' reasonable needs.

Chapter IV Protection of the Interests of Suppliers, Customers and Consumers

Article 20 Companies shall be honest and trustworthy towards their suppliers, customers and consumers. They shall not seek profits by means of false advertisement or promotion, nor shall they infringe upon the intellectual properties of their suppliers and customers like copyright, trademark and patent.

Article 21 Companies shall guarantee that the commodities or services they provide are safe.With regard to commodities and services that may threaten personal or property safety,

a truthful explanation, plain warning as well as user instruction shall be provided.

Article 22 In case serious defects are found in the commodities and services they provide, which may impose threat on the personal or property security of customers even at proper usage, Companies shall immediately report to the competent authorities and make public announcement. In the meantime, preventive measures shall be taken against any possible damage.

Article 23 Companies shall urge their customers and suppliers to comply with business code of conduct and moral ethics or stop partnership with customers or suppliers who refuse to make improvement in this regard.

Article 24 Companies shall establish appropriate procedures to strictly monitor and prevent commercial briberies between the Companies/employees and the customers or suppliers.

Article 25 Companies shall keep confidential the personal information of their suppliers and customers and, without authorization or permission, may not use or sell such information for profit.

Article 26 Companies shall provide excellent after services and properly handle the complaints and suggestions submitted by suppliers, customers and consumers.

Chapter V Environmental Protection and Sustainable Development

Article 27 Companies shall formulate environmental protection policies based on their impact on the environment. There shall be dedicated human resources in charge of the establishment, implementation, maintenance and improvement of their environmental protection system, and furnish necessary manpower, resources as well as technical and financial support to environmental protection.

Article 28 Companies' environment protection policies normally cover the following areas:

(1) to comply with all the laws, regulations and rules that govern environmental protection;

(2) to reduce resource consumption, including raw materials and fuels;

(3) to reduce waste generation and make every effort to recover wastes for recycling;

(4) to avoid, to the greatest extent, waste generation that pollute environment;

(5) to apply environmental-friendly materials and energy-saving, waste-reducing design, technology and raw materials;

(6) to minimize the adverse impact of corporate performance on environment;

(7) to provide trainings to employees for the purpose of enhancing environmental protection awareness; and

(8) to create an environment for sustainable development.

Article 29 Companies shall implement, as far as they can, facilities and processes that allow the greatest utilization of resources and lowest discharge of pollutants, as well as economical and rational technology for comprehensive utilization of wastes and pollutant treatment.

Article 30 Companies shall report to and file with the competent authorities regarding pollutant discharge. In case the discharge exceeds the national or regional standards, Companies shall pay a fee in accordance with the State regulations and assume the responsibility for the elimination.

Article 31 Companies shall allocate dedicated human resources for regular inspection of implementation of environmental protection policies. Behaviors in breach of environmental protection policies shall be rectified.

Chapter IV Public Relations and Social Welfare Services

Article 32 Companies shall pay due regard to the interests of their communities in business operation. The Exchange encourages that dedicated unit be set up and dedicated personnel be allocated to harmonize the relations between Companies and communities.

Article 33 Companies shall, as much as they can, take part in public welfare activities in their regions relating to environment protection, education, culture, science, public health, community development and poverty relief in the best interest of the regions.

Article 34 Companies shall accept the supervision and inspection of the competent authorities and pay due regard to the public comments and media reports on themselves.

Chapter VII Institutional Building and Information Disclosure

Article 35 The Exchange advocates that Companies should establish the social responsibility mechanism as required by these Instructions and work out social responsibility reports on a regular basis based on their review and evaluation of the status

quo.

Article 36 Companies may release their social responsibility reports along with their annual reports. The social responsibility report shall include， but not limited to, the following:

(1) implementation of social responsibility relating to employee protection, impact on environment, product quality and community relationship;

(2) assessment of implementation of these Instructions and reasons for the gap, if any; and

(3) measures for improvement and the timetable.

Chapter VIII Supplementary Provisions

Article 37 The power of interpreting these Instructions rests with the Exchange.

Article 38 These Instructions come into effect as of the date of promulgation.

Appendix B: Mining companies in sample

Number	Stock Code	Company Name
1	000552	Gansu Jingyuan Coal Co., Ltd
2	000655	Jinling Mining Co., Limited
3	000758	China Nonferrous Metal Co., Ltd
4	000762	Tibet Mineral Development Co., Ltd
5	000780	PingZhuang Energy Co., Ltd
6	000933	Shenhuo Coal & Power Co., Ltd
7	000937	Jin Zhong Energy Resources Co., Ltd
8	000968	Taiyuan Coal Gasification Co., Ltd
9	000983	Xishan Coal and Electricity Power Ltd
10	002128	Huolinhe Coal Industry Co., Ltd
11	002155	Chenzhou Mining Group Co., Ltd
12	002207	Zhundong Technology Co., Ltd
13	002340	Green Eco-manufacture Co., Ltd
14	002353	Jereh Group Co., Ltd
15	200053	Chiwan Petroleum Supply Co., Ltd
16	300084	Lanzhou Haimo Tech. Co., Ltd
17	600028	China National Petroleum Co., Ltd
18	600121	Zhengzhou Coal Industrial Co., Ltd
19	600123	Lanhua Sci-tech Venture Co., Ltd
20	600139	Westren Resources Co., Ltd
21	600188	Chongzhou Coal Co., Ltd
22	600259	Rising Nonferrous Metals Co., Ltd
23	600348	Shanxi Guoyang New Energy Co., Ltd
24	600395	Guizhou Panjiang Coal Co., Ltd
25	600397	Anyuan Industrial Co., Ltd
26	600489	Zhongjin Gold Co., Ltd
27	600497	Chihong Zinc & Germanium Co., Ltd
28	600508	Datun Energy Resources Co., Ltd
29	600546	Shanxi Coal Energy Group Co., Ltd
30	600547	Shandong Gold Co., Ltd
31	600583	Offshore Oil Engineering Co., Ltd
32	600714	Jinrui Mineral Development Co., Ltd
33	600971	Hengyuan Coal Co., Ltd
34	600997	Kailuan Energy Chemical Co., Ltd
35	601001	Datong Coal Industry Co., Ltd
36	601088	China Shenhua Energy Company Ltd
37	601101	HaoHua Energy Resource Co., Ltd
38	601168	West Mining Co., Ltd
39	601666	Tianan Coal Mining Co., Ltd
40	601699	Lu’an Environmental Energy Co., Ltd
41	601808	China Oilfield Services Co., Ltd
42	601857	PetroChina Co., Ltd
43	601898	China Coal Energy Co., Ltd

Appendix B: Mining companies in sample (Cont'd)

Number	Stock Code	Company Name
44	601899	Zijin Mining Group Co., Ltd
45	601918	SDIC Xinji Energy Co., Ltd
46	601958	Jinduicheng Molybdenum Co., Ltd
47	900948	Yitian Coal Co., Ltd

Appendix C: Electricity supply companies in sample

Number	Stock Code	Company Name
1	600008	Beijing Capital Co., Ltd
2	600021	Shanghai Electric Power Co., Ltd
3	600027	Haidian Power International Co., Ltd
4	600098	Guangzhou Industrial Co., Ltd
5	600101	Mining Xing Electric Co., Ltd
6	600116	Three Gores Water Electric Co., Ltd
7	600131	Minjiang Hydropower Co., Ltd
8	600167	Luenmei Holding Co., Ltd
9	600168	Sanzhen Industrial Holding Co., Ltd
10	600187	Heilongjian Water Treatment Co., Ltd
11	600212	Shandong Jiangquan Co., Ltd
12	600236	Guiguan Electric Power Co., Ltd
13	600283	Qianjiang Water Resources Co., Ltd
14	600292	Jiulong Electric Power Co., Ltd
15	600310	Guidong Electric Power Co., Ltd
16	600323	Nanhai Development Co., Ltd
17	600333	Changchun Gas Co., Ltd
18	600396	Shenyang Jinshan Energy Co., Ltd
19	600452	Fuling Power Co., Ltd
20	600461	Hongcheng Waterworks Co., Ltd
21	600505	Xichang Electric Power Co., Ltd
22	600509	Tianfu Thermoelectric Co., Ltd
23	600578	Jingneng Thermal Power Co., Ltd
24	600642	Shenergy Company Co., Ltd
25	600644	Leshan Electric Power Co., Ltd
26	600674	Sichuan Chuantou Energy Co., Ltd
27	600719	Dalian Thermal Power Co., Ltd
28	600726	Huadian Energy Company Co., Ltd
29	600744	HuaYing Electric Power Co., Ltd
30	600758	Hongyang Energy Resource Co., Ltd
31	600780	Shanxi Top Energy Co., Ltd.
32	600795	GD Power Development Co., Ltd
33	600863	Mengdian Huaneng Power Co., Ltd
34	600864	Harbin Hatou Investment Co., Ltd
35	600886	HUajing Power Holding Co., Ltd
36	600900	China Yangtze Power Co., Ltd
37	600969	Lindian InternationalCo., Ltd
38	600979	Guanguan AAA Public Co., Ltd
39	600982	Ningbo Thermal Power Co., Ltd
40	600995	Wenshan Electric Power Co., Ltd
41	601139	Shenzhen Gas Co., Ltd
42	601158	Chongqing Water Group Co., Ltd

Appendix C: Electricity supply companies in sample (Cont'd)

Number	Stock Code	Company Name
43	601179	China West Electric Power Co., Ltd
44	601991	Datang Power Co., Ltd
45	900949	Southeast Electric Power Co., Ltd
46	000027	Shenzhen Energy Group Co., Ltd
47	000037	Shenzhen Nanshen Power Co., Ltd
48	000426	Chifeng Fulong Power Co., Ltd
49	000531	Guangzhou Hengyun Holding Co., Ltd
50	000539	Guangdong Electric Co., Ltd
51	000543	An Hui Wenergy Co., Ltd
52	000600	Jointo Energy Investment Co., Ltd
53	000601	Guangdong Shaoneng Group
54	000685	Zhongshan Utilities Group Co., Ltd
55	000690	Baolihua New Energy Co., Ltd
56	000692	Huitian Thermal Power Co., Ltd
57	000695	Binhai Energy Co., Ltd
58	000712	Golden Dragon Development Co., Ltd
59	000720	Xineng Power Generation Co., Ltd
60	000767	GZ Electric Power Co., Ltd
61	000875	Jilin Power Share Co., Ltd
62	000883	Hubei Energy Co., Ltd
63	000899	Jiangxi Ganneng Co., Ltd
64	000939	Wuhan Kaidi Electric Power Co., Ltd
65	000958	Donfang Thermoelectric Co., Ltd
66	000966	Changyuan Electric Power Co., Ltd
67	000993	Mindong Electric Power Co., Ltd
68	001896	Henan Yuneng Holding Co., Ltd
69	002039	Guizhou Qianneng Power Co., Ltd
70	002267	Shenxi Natural Gas Co., Ltd
71	002479	Fuchunjiang Environmental Co., Ltd
72	200037	Shenzhen Nanshan Power Co., Ltd
73	200539	Guangdong Electric Power Co., Ltd

Appendix D: Chemical companies in sample

Number	Stock Code	Company Name
1	600061	Sinotex Development Co., Ltd.
2	600078	ChenXing Phosph-Chemicals Co., Ltd
3	600091	Baotou Tomorrow Co., Ltd
4	600146	Ningxia Dayuan Chemical Co., Ltd.
5	600155	Hebei Baoshuo Co., Ltd
6	600160	Zhejiang Juhua Co., Ltd.
7	600179	HeiLongJiang HeiHua Co., Ltd
8	600260	Kaile Science Technology Co., Ltd
9	600281	Taiyuan Chemical Industry Co., Ltd
10	600299	Blue Star Co., Ltd
11	600315	Shanghai Jahwa United Co., Ltd
12	600339	Dushanzi TianLi Co., Ltd
13	600352	Longsheng Group Co., Ltd
14	600378	Tianyi Science&Techology Co., Ltd.
15	600401	Jiangsushenlonhi-Techgroup Co., Ltd.
16	600444	Guotong Hi-Tech Pipes Co., Ltd
17	600527	Jiangnan High Polymer Fiber Co., Ltd.
18	600579	Yellow Sea Rubber Co., Limited
19	600599	Panda Fireworks Group Co., Ltd
20	600667	Wuxi Taiji Industry Co., Ltd.
21	600725	Yunnan Yunwei Co., Limited
22	600727	Shandong Lubei Chemical Co., Ltd
23	600803	Hebei Veyong Bio-chemical Co., Ltd
24	600810	Shen Ma Industry Co., Ltd
25	600885	Linuo Solar Energy Group Co., Ltd.
26	900951	Group Chemical Industry Co., Ltd.
27	000159	Xinjiang International Co., Ltd
28	000422	Yihua Chemical Industry Co., Ltd
29	000510	Sichuan Jinlu Group Co., Ltd
30	000553	Hubei Sanonda Co., Ltd
31	000589	Gui Zhou Tyre Co. Ltd.
32	000615	Hubei Golden Ring Co., Ltd.
33	000635	Younglight Chemicals Co., Ltd
34	000662	Softto Co., Ltd
35	000683	Yuan Xing Energy Co., Ltd
36	000703	Centennial Brilliance Science Co., Ltd
37	000723	Shanxi Meijin Energy Co., Ltd
38	000755	Sanwei Group Co., Ltd
39	000792	Salt Lake Potash Co., Ltd
40	000822	Haihua Company Co., Ltd

Appendix D: Chemical companies in sample (Cont'd)

Number	Stock Code	Company Name
41	000859	Guofeng Plastic Industri Co., Ltd
42	000936	Huaxicun Co., Ltd
43	000953	Hechi Chemical Co., Ltd
44	000985	Daqing Huake Co., Ltd
45	002014	Huangshan Novel Co., Ltd
46	002037	Jiulian Industrial Co., Ltd
47	002057	Sinosteel Tianyuan Tech., Co., Ltd
48	002068	Black Cat Carbon Black Co., Ltd
49	002108	Cangzhou Mingzhu Plastic Co., Ltd
50	002125	Xiangtan Electrochemical Co., Ltd
51	002145	CNNC Hua Yuan Co., Ltd
52	002170	Batian Ectopic Engineering Co., Ltd
53	002206	Zhejiang Hailide New Material Co., Ltd
54	002217	Liaherd Co., Ltd
55	002243	Shenzhen Beauty Star Co., Ltd
56	002254	Yantai Spandex Co., Ltd
57	002263	Great Southeast Packaging Co., Ltd
58	002324	Shanghai Pret Composites Co., Ltd
59	002343	Zhejiang Hexin Industry Group Co., Ltd
60	002372	Weixing New Building Materials Co., Ltd
61	002382	Blue Sial Plastic & Rubber Co., Ltd
62	002395	Double Elephant Fibre Material Co., Ltd
63	002409	Jiangsu Yoke Technology Co., Ltd
64	002427	Zhejiang Unifull Industrial Fibre Co., Ltd
65	002450	Kangde Xin Composite Material Co., Ltd
66	002464	Kee Bright Decorative Tech. Co., Ltd
67	002476	Polymer Bio-Chemicals Co., Ltd
68	002497	Yahua Group Co., Ltd
69	300031	Boton Belt Co., Ltd
70	300054	Dinglong Chemical Co., Ltd
71	300072	Beijing SJ Materials Co., Ltd
72	300108	Shuang Long Chemical Industry Co., Ltd
73	300132	Fujian Green Pine Co., Ltd